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A Pilot Study to Determine Gender Differences in the Detection of Deception: Accuracy, Cues, and Skepticism

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A PILOT STUDY TO DETERMINE GENDER DIFFERENCES IN THE DETECTION OF DECEPTION: ACCURACY, CUES, AND SKEPTICISM

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ABSTRACT

A Pilot Study to Determine Gender Difference in the Detection of Deception; Accuracy, Cues, and Skepticism

How accurately people use verbal and nonverbal cues to detect deception appears to be a function of a skeptical orientation toward the truthfulness of the subject. In previous studies, some differences in gender and the detection of deception are cited, but most studies are inconclusive about whether such differences exist. In the present study, university students are asked to judge brief interviews of suspects in a mock crime criminal investigation. Suspects are either "guilty" or "not guilty" in the mock crime scenario. "Guilty" suspects include two persons who are present at the time of the mock crime. A third person, the "not guilty" suspect, is not present during the mock crime. The subjects are asked to indicate whether they felt each suspect is truthful or deceptive in the suspect's responses to five questions. Subjects are asked to also indicate which, if any, of six nonverbal cues they use in making this decision. The findings of this study, as well as future implications for studies, are discussed.

TABLE OF CONTENTS

List of Tables

CHAPTER I

Introduction

Deception has been with man since the dawn of time. The serpent knowingly deceived Eve in the book of Genesis. The message from God was clear: "Do not eat from the tree of knowledge" (Genesis 3:4). But Adam and Eve disobeyed the clear will of God, ate from the tree of knowledge, and told God they had not eaten from the tree, thereby creating "original sin." Regardless of the trouble that arises for people who deceive, deception continues to this day.

Bok (1978) identified four reasons why people deceive: (1) for personal gain, (2) to get even, (3) to protect people, or (4) for concealment. The last reason, concealment, has caught the attention of social scientists and psychologists, resulting in numerous studies over the past thirty years (Ekman and Friesen, 1974, Ekman, 1988, Feldman, et. al., 1979, Knapp & Comadena, 1979). These studies are not only concerned with why people deceive, but what they do when they deceive. Specifically, these studies have examined verbal and nonverbal inconsistencies in response to certain stimuli. Using experimental designs, researchers have tried to isolate one variable -- normal behavior-- and compare it to another variable -- abnormal behavior. This, in turn has allowed researchers to make inferences about a person's behavior in a given situation, creating some level of predictability for future reference.

Along with this idea of predictability, accuracy in detecting deceptive acts has also been studied (Bauchner, Kaplan, & Miller, 1980; Bond & Omar, 1992; Ekman & Friesen, 1974; Feldman, Heilveil, & Muehleman, 1981; Jenkins, & Popoola, 1979; Sitton & Griffin, 1981). Cross-cultural differences and socioeconomic differences have been

studied, as well (Bond & Omar, 1992). Results of these studies have indicated that deception was somehow linked to inconsistencies between normal and abnormal nonverbal behaviors (Bauchner, et. al., 1980).

The results of these studies are somewhat contradictory. For example, according to Zuckerman, Depaulo, & Rosenthal (1982) and Zuckerman, Koestner, and Colella (1985), an increase in the movement of the arms and hands indicates deceptive activity. But Bond, Omar, Urvashi, Lashley, Skaggs, & Kirk (1992) and Ekman (1988) suggest that a decrease in the movements of the arms and hands is an indicator of deceptive activity (Vrij, 1992). Inconsistencies like these have social scientists perplexed. The question to be answered is whether there is one foolproof way to detect deception. Arguably, many people do not accept the premise that one particular body part is the best indicator of deceptive activity. Don Rabon of the North Carolina Justice Academy claims that the eyes are the best indicators of deception (1992), while Paul Ekman maintains the face is the best indicator of deception (1974). Clearly, there is a lack of consensus among researchers regarding which part of the body represents the most consistent indicator of deception and the type of action or inaction that indicates deception.

Researchers have studied subjects with similar characteristics. College students have been popular subjects of study (Bauchner, Kaplan, & Miller, 1980; Bond & Omar, 1992; Donaghy & Dooley, 1994; Feldman, Jenkins, & Popoola, 1979; Heilveil & Muehleman, 1981; Pennebaker & Chew, 1985; Sitton & Griffin, 1981; Vrij, 1992). These students, mostly from undergraduate psychology courses, participated in studies to

fulfill some course requirement, so that by participating, these students were completing part of the course curriculum, and receiving extra credit for their participation.

There is a plethora of research concerning nonverbal behavior and its relationship to deception, which is displayed in the reference part of this paper (Gordon, 1987, "Expectations of honest, evasive, and deceptive nonverbal behavior," Mclintock & Hunt, 1975, "Nonverbal indicators of affect and deception in an interview setting," etc.). With new knowledge about the physiological nature of the human body, social scientists continue to study the nature of the relationship between nonverbal behavior and deception so they can draw inferences about which nonverbal cues, if any, best indicate deception. Professionals in the criminal justice system, especially law enforcement officers, often use this bank of knowledge, along with years of experience, to determine whether a person is being truthful or deceptive.

Purpose

The purpose of this thesis is to sift through the vast array of knowledge concerned with deceptive communication and establish some connection between this research and its application in the criminal justice system. To be more specific, this thesis focuses on three areas: (1) accuracy of students in Criminal Justice classes in detecting deception, (2) gender differences in skepticism, and (3) gender differences in nonverbal behavior when engaging in deception.

The topic of deception has many important implications for the criminal justice profession. The ability to detect deception from certain nonverbal behaviors could result in more accurate investigations. By identifying indicators of detection, detectives can

save time and resources for other parts of an investigation, such as preparing for courtroom testimony, report writing, fact gathering, and interviewing of other potential witnesses. These are just a few of the many possible implications for accurately being able to detect deception. With new studies being conducted every day in the field of nonverbal communication and deception, implications such as the ones mentioned above could become reality, not just theory.

Definitions

Defining nonverbal communication is certainly much easier than interpreting nonverbal behaviors. Nonverbal communication can be defined as any physical reaction by the human body that occurs in the presence of some stimulus (Myers, 1986). For example, a person might smile when greeted by a friend. If the same person is no longer smiling when greeted by a friend, this could indicate a change in their behavior. It is this kind of reaction that exemplifies nonverbal communication.

An individual who is attempting to detect deception during an interview compares two types of behavior: normal and non-normal. Normal behavior is that type of behavior that occurs as a result of someone who is willing to divulge information. Non-normal behavior occurs when a person is trying to conceal some information he or she is not willing to divulge (Ekman, 1974). By comparing these two types of behavior, one can make certain generalizations about the validity of a statement. The person conducting the interview evaluates any differences in the two types of behavior and makes a decision about the truthfulness of a statement. The end result is the acceptance or denial of a truth claim.

In the context of this study, the term skepticism refers to how one gender more closely examines either a male or female for signs of dishonesty. In other words, if a female were to make a judgment about truth claims made by both a male and a female, she would designate one gender untruthful more often than the other. This applies for the male gender, as well.

Student observer is defined as the student who participated in this research study who attempted to make correct judgments on the subjects in the interviews. Subjects were those students selected to participate in the mock crime scenario, and answer questions in regards to the mock crime. Deception was defined as any time a subject was being dishonest when answering a question in the mock crime interviews.

The remainder of this paper will concentrate on four different areas. First, a thorough review of the literature will uncover the findings of a number of previous studies on the topic of deceptive communication. Second, to test the findings of these studies, an experiment will be developed and conducted to evaluate: (1) the accuracy of previous findings, and (2) new developments not mentioned or discovered in previous studies. The section entitled “Analysis and Evaluation” will reveal the findings of the experiment. The final section of this paper, evaluation of the experiment, will reveal flaws in the quasi-experiment, or improvements that need to be made to the quasi-experimental design. This will add to the knowledge already available, hopefully uncovering some additional information about the controversial issue of detecting deception.

CHAPTER II

Review of Literature

The present section focuses on previous research in the subject area of nonverbal communication and deceptive activity. It is necessary to thoroughly review these studies, so the reader can have an understanding of the developments that have been made throughout the past thirty years.

Most of these studies are similar in their foundation literature. They identify past theories about deceptive communication, and focus their research on one or more nonverbal behaviors. These studies conclude that the behaviors are either indicative of deceptive activity or unrelated to deceptive activity. These studies also are similar in their use of subjects. Most use college students as research subjects. These students participate as a means of fulfilling a particular course's requirements and are usually from an introductory psychology course.

One major difference in these studies is found in the research design. Some studies evaluated the behavior of the subjects (Ekman & Friesen, 1975). Other studies used the subjects as evaluators of the behavior of others (Ekman & Friesen, 1969). Some studies utilized both of these methods (Feldman, 1979). In these studies, some researchers had a preconceived idea about a possible connection between a particular nonverbal behavior (for example, eye movement) and deceptive activity (Rabon, 1992). In these studies, the researcher looked for this activity during deceptive responses. Other researchers evaluated subjects and tried to connect nonverbal behaviors to deception,

without first having an idea about which nonverbal behaviors were present during deception (Bauchner, Kaplan, & Miller, 1980).

Ekman was a pioneer in researching nonverbal behavior and deception. In 1969, Ekman and Friesen conducted a study. Their hypothesis was that the body was a more accurate indicator of deception than the face. They asked nursing students to observe nonverbal behavior to identify deception. The students were no more accurate in detecting deception through observation of the body than through observation of the face. Even when the students observed normal behavior and non-normal behavior, they were no more accurate in detecting deception using facial observation than using body observation (Ekman & Friesen, 1969). However, in a subsequent study, Ekman and Friesen (1974) found that accuracy in detecting deception through observation of body movement improved when subjects were given an opportunity to observe both normal and non-normal behavior and body and facial activities.

McClintock and Hunt (1975, p. 60) conducted a study to analyze "nonverbal indicators of affect and deception in an interview setting." Ten female and ten male subjects participated in this study that focused on five behaviors: eye contact, smiles, gestures, self-manipulations, and postural shifts. Eye contact was defined as the amount of time a subject looked at the interviewer. Smiles were not defined. Instead, subjects were free to interpret the word based upon their own definitions. Gestures were defined as the free movements of one body part, without the need of contact with another body part. Self-manipulations were defined as "any movement of the arms, hands, fingers, legs, or feet in moving contact with another part of the body" (p. 59). Scratching one's

nose was an example of a self-manipulation. Postural shifts were measured by the number of times a person's seating position was changed. Results of this study indicated that decreases in smiling, and increases in self-manipulations and postural shifts marked deceptive responses. Eye contact and gestures were not found to have high correlation values to deceptive activity.

These early studies were concerned with finding a decrease or an increase in some types of nonverbal behavior during deception. After recognizing the frequency of this behavior, researchers tried to connect the nonverbal behavior with truthful or deceptive responses. These studies did not account for differences in gender or in cultural background. Later studies took more variables into account. Not only were nonverbal behaviors variables, but also other factors, such as gender, race, and ethnicity were variables of interest in these later studies.

Ekman, Friesen, and Scherer (1976) conducted a study analyzing body movements and voice pitch during deception. Body movements were broken down into three categories: illustrators, shrugs, and adapters. Illustrators were "those movements tied to speech rhythms" (p. 130) to illustrate what was said. People who "talk with their hands" (p. 126) demonstrated this type of behavior. Shrugs were defined as the rotation of the hands at the wrist to symbolically transmit a message of uncertainty. Shrugs also were associated with the movement of the shoulders. Adapters occurred when one hand made contact with other body parts for the purpose of rubbing and/or scratching. Results of this study indicated that deceptive interactions produced a decrease in the use of

illustrators and an increase in the use of shrugs. In this study, adapters were not found to be significantly related to deceptive activity.

Ekman and Friesen (1974) had previously formulated the theory that deceptive subjects managed the impressions given off by their faces more than those given off by their bodies. Under this theory, because people are more concerned with controlling their faces during deception, they neglect to account for cues given off by the body. The results of Ekman, Friesen, and Scherer's study support this theory (1976).

Not only have researchers conducted studies involving nonverbal behaviors and deception, they also have conducted studies to test how people reacted to different types of lies. Knapp and Comandena (1979) analyzed the studies conducted involving deceptive communication. They concluded that people would react to stress in different ways, and those who had time to prepare or practice a behavior would show fewer signs of anxiety. This further supported the theory that there is a difference between spontaneous and prepared lies.

Knapp and Comandena (1979) analyzed a study conducted by Maier and Lavrakas (1976). Maier and Lavrakas (1976) found that females believed that lies from males to females were more reprehensible than lies from females to males; males felt just the opposite. They merely asked both males and females what they believed to be the most reprehensible type of lie. Both sexes, however, rated lies to a friend, as compared to lies to a stranger or an associate, as more reprehensible. This supported the theory that gender differences existed within deceptive transactions because females and males were found to disagree about which lies were more reprehensible.

During the 1970's, researchers of nonverbal behavior began to look at an increasing number of variables outside of nonverbal behavior. Researchers became more creative and attempted to explain deception through age (Hocking & Leathers, 1980) and gender (Feldman, Jenkins, & Popoola, 1979), as well as cultural differences (Feldman, 1979), as is evident in the following study.

In 1979, Feldman conducted a study analyzing deceptive behaviors by urban Koreans. Feldman analyzed facial expressions of three different age groups, first graders, seventh graders, and college students. The subjects were secretly videotaped while lying, not knowing their behavior was being monitored. Results of this study indicated that all but the female seventh graders were successful at nonverbal deception. The female college students were the most successful at imitating a truthful response while being deceptive.

Feldman, Jenkins, and Popoola (1979) conducted a study aimed at detecting deceptive activity in adults and children through observation of subjects' faces. The results suggested that gender differences existed in a person's ability to conceal, or at least control, his or her facial expressions. According to the study, females were found to be better at concealing deception in their facial expressions than males. The researchers concluded that the older a person gets, the more aware the person was of his or her own natural tendencies and idiosyncrasies. Because of this, older people were better able to control their behaviors to conceal deception.

Kraut and Poe (1980) evaluated deceptive cues in a different manner from previous studies. Kraut and Poe analyzed the different cues used by customs inspectors

and laymen to detect deception. The purpose of this study was to determine which behavioral cues the two groups used to determine whether a person's bags needed to be inspected more thoroughly in an airport terminal. Results indicated that travelers were more likely to be inspected with greater scrutiny if they: (1) were young, (2) belonged to a lower socioeconomic class, (3) exhibited nervous behavior, (4) hesitated before answering a question, (5) gave short answers, (6) avoided eye contact with the person asking questions, or (7) shifted their posture while being seated. This study concluded that nonverbal cues were used in the evaluation of a person's behavior. Because these behaviors were displayed during questioning, it was anticipated that people were being, in some way, secretive about the contents of their luggage. However, the results of this study did not produce accurate rates of detecting deception for either customs inspectors or laymen. In fact, experimental travelers who were given contraband were "good liars" (p. 790). The customs inspectors and laymen were less suspicious of the experimental travelers. As a result, the researchers concluded that neither of the two groups were good detectors of deception.

Bauchner, Kaplan, and Miller (1980) evaluated the ability of subjects to detect deception during an initial encounter with a person unknown to the subject compared to interaction with a person known to the subject. They concluded that deception was detected more accurately when an individual was familiar with the behavior of the person practicing deception. They noted that such nonverbal behaviors as facial expressions, eye contact, head nodding, hand and body movement, and posture were used to detect

deception. However, none of these nonverbal behaviors was determined to be more effective than others in detecting deception.

For the most part, these initial studies of nonverbal behavior and its relationship to deception concentrated on how a person who was being deceptive exhibited a certain nonverbal behavior more often than a person who was being truthful. However, a study by Hocking and Leathers (1980) found that certain behaviors actually decreased during deception. They found that deceivers in general exhibit less overall body movement than those people being truthful. The study concluded that, while deceivers exhibited greater vocal nervousness, they exhibited significantly fewer foot movements per minute and shorter eye contact than non-deceivers. They found that deceivers did not sustain eye contact with the interviewer as long as their truthful counterparts. Deceivers did not, however, look away from the interviewer as often as a truthful person did. Overall, the study concluded that deceivers exhibited less total body movement than non-deceivers.

Eye contact has been a heavily researched nonverbal behavior. A study conducted by Sitton and Griffin (1981) analyzed such eye behavior and its relationship to deceptive activity. Sitton and Griffin also analyzed whether racial differences affected the presence of nonverbal cues. Twenty-eight college students participated, half of whom were instructed to give a false statement, the other half were instructed to give a true statement. The researchers concluded that those students providing false statements maintained eye contact longer with the interviewer than those students providing truthful statements. This finding was contradictory to the finding by Hocking and Leathers only a year prior. Sitton and Griffin also concluded that race was not a factor in determining deceptive

activity, because both black and white subjects demonstrated the same pattern of eye contact duration.

Also in 1981, Heilveil and Muehleman conducted a study that analyzed the possibility that nonverbal behaviors were connected to deception. This study was different from previous studies in that the researchers analyzed success rates for detecting deception, and for detecting truthful responses. Heilveil and Muehleman rated the frequency of nine nonverbal behaviors during deceptive activity. Twenty-six subjects were instructed to lie on predetermined questions, and were evaluated on the basis of the nine nonverbal behaviors. Results indicated that the length of a person's response, the number of speech errors, and the length of hesitation before answering a question were all positively associated with deceptive activity. One interesting finding of this study was the success rate in determining truthful responses. The people evaluating the responses of the twenty-six subjects were successful 97.1% (104 out of 110) of the time in determining truthful responses. Interestingly, Heiveil and Muehleman did not try to determine whether certain nonverbal behaviors occurred at higher or lower rates during deceptive activity, only that they occurred at all during deceptive activity.

A study conducted by Parham, Feldman, Oster, and Oladeji (1981) examined intergenerational differences in the ways people deceive, as well as the ways people detect deception. Age and gender were analyzed across these two paradigms. This study appears to have been the first of its kind to explore the possibility of gender being a determining factor in the detection of deception.

In that study, Parham, Feldman, Oster, and Oladeji (1981) analyzed intergenerational differences in the way people: (1) decode nonverbal behavior and (2) give off nonverbal behaviors. They analyzed how the age and gender of a subject affected accuracy in determining deception. Subjects were required to taste two drinks, saying that both drinks "tasted good." One of the drinks was sweetened grape juice; the other drink was unsweetened grape juice, which was quite bitter. Other subjects were asked to evaluate the responses and determine which statement was truthful and which was deceptive. Sixty-two young adult judges were chosen: 37 females and 25 males with a mean age of 19.1 years. Forty-two elderly adults were chosen: 27 females and 15 males with a mean age of 72.1. All judges satisfied the minimum vision requirement of 20/30 vision. Results produced a number of differences between subjects. Specifically, young adult decoders could better detect deception in young females. In addition, elderly male subjects were better able to conceal their deception. Young adult males were rated as liking the bitter drink the least, while the older males were rated as liking the bitter drink the most. This study concluded that age and the ability to conceal one's nonverbal behavior were correlated. The results suggested that the older a person was, the more accurate he or she was in the detection of deception. Gender was also noted as young females were seen as being better deceivers than young males.

Zuckerman, Spiegel, Depaulo, and Rosenthal (1982) found that if a subject believed a person was deceptive, the subject was less influenced by the face and more influenced by the body. This finding contradicted Ekman and Friesen's (1969) finding that people rely more on facial cues than body cues to detect deception. While the

difference could be due to the separation of time, it is more likely that the difference was due to the difference in subjects used. Ekman and Friesen (1969) used nursing students, whereas Zuckerman, Depaulo, and Rosenthal (1982), used psychology students. It is also possible that neither study was completely accurate.

Nonverbal behaviors have been studied in relation to lying in general and they have also been studied in relation to certain types of lies. Cody and O'Hair (1983) analyzed the differences between spontaneous and prepared deception across gender lines. Seventy-two undergraduate students were used as subjects. Data failed to link gender differences with laughter/smiling or duration of eye contact. However, gender differences were cited with regard to nonverbal behavior during different types of deception. Males were found to "suppress" leg/foot movements during prepared responses, whereas females were found to "suppress" leg/foot movements during spontaneous responses.

Zuckerman, Koestner, and Colella (1985) conducted a study examining deception via three communication channels: face only, speech only, and face plus speech. Results indicated that a subject was no more likely to detect deception when that subject had prior knowledge of a person's normal behavior, than when the subject had no prior knowledge of a person's normal behavior. The face also was found to be a controllable channel of deception, contradicting the findings of Ekman and Friesen (1969) that the face was a good indicator of deceptive activity.

The studies described up this point have used human intuition as the instrument measuring deceptive activity. As the next study reveals, mechanical devices also can detect behavioral changes both externally and internally.

Pennebaker and Chew (1985) conducted a study measuring "behavioral inhibitions and electro dermal activity" (p. 1428) during deceptive interaction. Their hypothesis was that as a person was subjected to increased levels of stress, that person would perspire, making the person appear deceptive in some manner. This hypothesis assumed that deception was stressful so that the more deceptive a person was the more the person perspired. The research supported their hypothesis. The researchers also found that certain behaviors were present during deceptive activity. They found that facial expressions and changes in eye movement decreased in those subjects who were deceptive. This was consistent with previous findings. They also discovered a negative correlation between level of skin resistance, which increased during deceptive responses, and facial expressions and eye movement, which decreased during deceptive responses.

Gordon, Baxter, Rozelle, and Druckman (1986) conducted a different kind of study. Their study did not evaluate a person's behavior while responding to questions. Instead, they evaluated which nonverbal behaviors people thought were significant correlates of deceptive activity. The study asked sixty-eight undergraduates to evaluate twenty-three nonverbal behaviors in an attempt to discover which behaviors occurred seldom, moderately often, or often during three types of responses: (1) honest, (2) evasive, and (3) deceptive responses. The students indicated their beliefs that eye contact increased during truthful responses, whereas facial expressions (blinking, smiling, and

frowning) increased during deceptive or evasive responses. The results indicated that the student respondents were aware of the channels correlated with deceptive activity; however, the authors noted that the same students who were aware of the channels correlated with deceptive activity might not have known which channels to ignore. These findings were consistent with past research, which concluded that eye contact was increased during truthful responses and facial expression increased during deceptive responses.

The studies described thus far have been somewhat inconsistent. For example, one study found the face to be a poor indicator of deception (Ekman et. al., 1969), while another study found the face to be a good indicator of deception (Zuckerman et. al., 1985). Ekman (1988, p. 174) summarized the findings in the area of nonverbal communication and deception by concluding that "behavioral cues to deceit were neither predictable nor understandable without first understanding why and when these behaviors appeared in one or another deceptive contexts." With this in mind, Ekman hypothesized that before people use nonverbal cues to detect deception, they must first understand the context from which the cues originated. People initially establish whether they are speaking to someone who normally uses nonverbal behavior to communicate, or to a person who uses only the voice as a means of communication. According to Ekman, if a person's normal behavior is understood, it is easier to understand when a person is not displaying normal behavior.

Ekman (1988) also discussed the different behaviors that had been observed to either decrease or increase during deceptive activity. Ekman hypothesized that pause,

gaze aversion, speech disfluencies, and speech mannerisms increased over what was usual for a particular person during a deceptive response. He also hypothesized those illustrators, including hand movements and speech rhythms decreased when people lied. Finally, Ekman hypothesized that, when combined, the face and voice provided a high rate of accuracy in the detection of deception.

In the 1990's, researchers continued to study nonverbal behaviors by examining subjects in similar settings, such as scenarios where subjects were asked to be deceptive, while people judged the subjects' behaviors (Gorden, 1992). Findings from these studies were consistent with previous findings that some behaviors were suppressed during deception, while others were increased during deception.

Some of these studies also made claims that, with experience, one could become more accurate at detecting deception. This was the case in a book written by Ray Gorden. His book, Basic Interviewing Skills (1992), revealed consistent findings outlined by previous studies dealing with nonverbal behavior. Gorden made claims similar to those made by such researchers as Ekman (1969 & 1974), Friesen (1974), Knapp (1979), and Kraut and Poe (1980). Gorden claimed that people tended to control their facial expressions more than their body posture, hands, arms, and feet and legs. He also claimed that in order for an interviewer to be successful at interpreting nonverbal behavior, the interviewer had to know how a person reacted in ordinary conversation. The significant changes in a person's nonverbal behavior were easier to interpret if one first understood a person's normal behavior. Gorden used the term "sociable" to refer to a person involved in "normal behavior" (p. 114). Gorden's book substantiated the idea that nonverbal

behavior is different for a person who was under some type of stress, such as deception, as opposed to normal conversation.

Vrij (1992), a professor in the Psychology Department at the University of Portsmouth in the United Kingdom, analyzed arm and hand movements and their relationship to deceptive activity. Vrij studied 51 men and 13 women, with a mean age of 22. The study revealed that during interviews in which the subject was being deceptive, subjects showed a decrease in head movements; trunk movements, or postural shifts; leg and foot movements; smiling; laughing; gaze aversion; and "ah" speech disturbances. In addition, Vrij concluded that the pitch of voice in deceivers was higher than truth-tellers' pitch (Vrij, 1992).

Bond, Omar, Urvashi, Lashley, Skaggs, and Kirk (1992) examined how people perceived certain behaviors as more deceptive than other behaviors. Results indicated that people who exhibited "weird" behaviors, such as the closing of their eyes, staring in one direction, raising an arm to the ceiling, extending an arm forward, and raising one shoulder higher than the other, were perceived as deceptive by the respondents. However, the perceptions of the respondents were not supported by their ability to distinguish truthful answers from false answers through observation. The average subject was not successful at discriminating lies from truths, indicating that a person was just as likely to guess and get the same result as one who had used a certain nonverbal behavior in making a judgment.

Some of the studies mentioned in this review did not attempt to find a correlation between deception and nonverbal behavior. One researcher attempted to find a specific

pattern or connection between nonverbal behaviors and speech rhythms, without connecting these behaviors to deceptive activity. Streeck (1993) conducted a study analyzing particular nonverbal behaviors in connection with speech patterns. He was trying to connect speech with certain body movements, specifically looking at hand movements and their relationship, if any, to speech patterns. Streeck did not try to connect these movements with deceptive activity, only to speech patterns. Streeck anticipated that other researchers could use his research as a springboard for conducting research on deception, since interrogators relied on the same type of analysis in attempting to decide the truthfulness of statements.

Streek's research was relevant to methods used to detect deception. For example, if a person exhibited a certain behavior when being truthful, and suppressed that same behavior when being deceptive, an interrogator would be able to determine when a person was being deceptive. The interrogator could establish a baseline, asking questions that provoked thought, not related to the purpose of the interview, noting the types of behavior that were displayed. The interrogator could then ask questions relevant to the interview, such as questions pertaining to a particular crime, and make note of any significant changes in nonverbal behaviors. The two responses could be compared in relation to each other, at which point a decision could be made about the validity of the statements (Streeck, 1993).

The book, Deceptive Communication, written by Gerald Miller and James Stiff (1993), was divided into a number of sections, covering such areas as defining deceptive behavior, investigating deceptive behavior, and characteristics of deceptive behavior. For

the most part, Miller and Stiff studied nonverbal behavior and its relationship to deceptive communication, as well as how different conditions, such as gender differences, might affect the detection of deception. Many conclusions reached by Miller and Stiff coincided with the findings of research previously discussed. However, both Miller and Stiff concluded that the detection of deception might not be classifiable. Rather, it might just be individualistic. The idea of mere chance was also discussed. According to Miller and Stiff, some researchers had come to the conclusion that detection of deception by guessing could produce the same accuracy rates as detection of deception by use of some set of rules. This conclusion established a challenge for future research in the field of nonverbal behavior.

The most recent studies conducted in the subject area of nonverbal behavior and deceptive communication has resulted in findings consistent with previous studies. Subjects used in these experiments saw certain behaviors as related to deceptive activity in one way or another.

Vrij, who had conducted a study in 1992, conducted another study in 1996 examining the possibility that prisoners could best detect deceptive behavior. Vrij hypothesized that "prisoners would have the best idea about clues of deception, due to the fact that they receive the most feedback about successful deception strategies" (p. 65). The results of Vrij's study supported this hypothesis. The accuracy of prisoners in detecting deception favorably compared to the accuracy of such groups as police detectives, patrol officers, correctional officers, customs officers, and college students.

Vrij (1996) compared a subject's ability to accurately detect deceivers and truth-tellers, and found that the difference between the two rates was very small. Vrij claimed that observers associated deception with a variety of nonverbal behaviors, because observers assumed that a person who was deceptive would be more nervous than a truthful counterpart. He also claimed that perceived deception was thought to occur with concurrent changes in gaze aversion, postural shifts, trunk movements, and manipulators. Perceived deception resulted in a decrease in these movements, but actual deception resulted in an increase in these movements (p. 67). He concluded that work experience did not increase the likelihood that a person would become more successful at the detection of deception. This finding was inconsistent with previous findings concerning success rates and experience (Vrij, 1996).

Vrij's 1992 study also had concluded that experience did not affect accuracy rates. In that study, Vrij used detectives as subjects. Results produced an accuracy rate of 46% in detecting deception, and an accuracy rate of 51% in detecting truthful responses. The results indicated that experience did not increase the likelihood of accuracy in the detection of deception. The 1996 study provided support for this finding. However, Vrji concluded in 1996 that prisoners were more accurate than other groups at detecting deception.

Buller et. al. (1996), claimed that "people routinely adjust their communication in response to another" (p. 591). This concept of deceptive communication was consistent with previous research showing that suspicion caused senders to adjust their communication to receivers. Under this concept, when a person was deceptive, that

person adjusted his or her normal behavior, and presented an abnormal behavior to the person receiving the message. For example, a person who does not normally use his or her hands when talking could possibly begin moving the hands when being deceptive. Buller et. al., also claimed that when a person suspected his or her message was believed by the receiver, very little behavior adaptation occurred. However, when a person suspected his or her message was not believed, the behavior adaptation was greater than the adaptation in the group that perceived themselves believed.

As for the behaviors themselves, Buller et al. (1996), claimed that people who were not truthful reduced their kinesic, gestural, and body activity, most likely to avoid being perceived as dishonest. They found that deceivers smiled and displayed other pleasant affects to project a positive front (Buller, et al., 1996). This finding also was consistent with previous studies.

Aside from the many studies that have been conducted in the area of nonverbal communication and deception, there also have been some books written on the subject matter. These books not only outlined what kinds of behaviors to look for in interrogative settings, they also explained different ways to conduct interviews, including modification of environmental settings. Law enforcement officers have used this information to structure their interviews, to achieve efficiency, and to increase success.

John Hess explained his ideas in a book entitled Interviewing and Interrogation for Law Enforcement (1997). Hess compared the human to a saber-tooth tiger. He said that when early humans were confronted with a dangerous situation involving a life-threatening opponent, they either fought for their lives, or ran away from the situation.

This is commonly called the fight or flight response. Regardless of the path chosen, a number of physiological changes occurred in response to danger. Pulse and breathing rates increased, sweat glands were activated, pupils dilated, salivary glands shut down, and digestion ceased (Hess, 1997).

According to Hess (1997), these same types of responses were noticeable in an interrogation setting as well. According to Hess, the body of a guilty person reacted to the stress of attempting to conceal information through the physiological channels mentioned above. Some of these responses were not visible to the untrained eye; some were not visible at all. The person being interrogated was either going to fight or run; if the person ran, guilt would be assumed. If the person fought, guilt also would be assumed. For this reason, Hess hypothesized that the person being questioned would try to mask his or her responses to cover up the incriminating nonverbal behavior. Paul Ekman (1969) first used the term "masking" to describe how a person tried to conceal nonverbal behavior. According to Hess, because the person tried to conceal his or her behavior, a trained interrogator could notice such attempts and make certain judgments about the person's truthfulness (Hess, 1997).

Roger W. Shuy (1998) shed some light on the confusing nature of nonverbal communication. Shuy agreed with Paul Ekman (1986), that such instruments as the Psychological Stress Evaluator (PSE), Mark II Voice Analyzer (MVA), the Hagoth, and the Voice Stress Monitor all detect only stress, not deception. Deception was inferred because the person was under stress. The person could be angry with the interrogator for a reason not associated with that person's assumed guilt, resulting in truthful responses

being incorrectly construed as deceitful, thereby creating a false positive. False positives are those responses that appear to fit the model of deception, but do not represent a false or deceptive response. According to the model used in the techniques mentioned above, a person under stress was concealing information, and was, therefore, guilty. However, the person might not be factually guilty, but responding to other factors not directly related to interrogation. This could cause innocent people to suffer consequences not intended for them (Shuy, 1998).

The literature covered in this section reflects some inconsistencies; certain behaviors were said to increase during deceptive transactions, while other studies concluded the same behaviors decreased during deceptive transactions. For the most part, though, the literature does not reflect consistent findings, but it is clear that a person does modify behavior in some manner while interacting in a deceptive context. The degree of this modification still remains uncertain.

Most of the studies conducted offered incentives to participants to encourage their participation. One could conclude that incentives were somehow linked with the way a person modified his or her behavior. For example, if a person was given a grade in a class to participate in a study, and would be given extra credit for successfully deceiving a person analyzing that person's behavior, it may be possible that the incentive influenced the deceptive behavior of the participant. This could lead to the idea that motivation can influence a person's ability to deceive. These studies did not contain a large amount of information concerning gender differences during deception, although some studies

concluded that gender did have an impact on the way a person communicated through nonverbal behavior.

The primary focus of this thesis is to determine whether gender differences exist in the various ways people communicate. In addition, this study will seek to determine the accuracy of each gender in detecting deception, and the level to which each gender is skeptical of a deceiver. If gender does have an impact on nonverbal behavior, this could represent significant information for those agencies that utilize communications studies.

These studies have an impact on the way people attempt to detect deception. It is, therefore, necessary to continue to study the physiological aspects of the human body, so that one day the full meaning behind nonverbal communication may be exposed. The studies analyzed benefit agencies that use interviews. Communication is a necessary part of life; without it, the human race would not function properly. The study of communication is an important aspect in all realms of society. Without these studies, the comprehension of nonverbal behaviors would be misunderstood and misused. This, in turn, could result in negative consequences for those under investigation for murder, rape, and other serious crimes that have plagued society. At the very least, the comprehension of nonverbal communication will enable individuals to fully understand a sender's message, making communication much clearer.

The literature covered discussed a number of different methods in which researchers have used to pinpoint specific nonverbal behaviors as being the key element in detecting deception. The research designs employed numerous methods and different

groups to study. In the next section the pilot study and the design to be employed during the data collection for this study are discussed.

CHAPTER III

Methods

This section has two components. The first part of this section entitled "Problems cited in the initial pretest discusses the initial experimental design and the problems cited in the initial experiments. The pilot study was conducted to help develop a final experimental design. The second part of this section, entitled "Methodology," outlines the final experimental design that was constructed and eventually used in the data collection process.

Problems Cited in the Initial Pretest

The experimental design used in the initial pretest used forty student observers. Three students in the audience were asked to be subjects in an experiment involving a mock crime scenario and interview. Two subjects were females and the third was a male. Prior to the mock crime, each subject was instructed, verbally and in written instructions, to deny any involvement in the mock crime during the interview. All subjects answered truthfully on the first five questions, but not all subjects answered truthfully on the second five questions. The first set of five questions consisted of questions not relating to the mock crime scenario. The second set of five questions dealt with the mock crime scenario. Prior to the interviews, student observers were made aware that the answers to the first five questions in each interview were truthful responses.

These questions were asked in a manner that allowed student observers to establish a baseline behavior for each subject. The first five questions asked were those questions that the subjects would answer truthfully. The second five questions were those

questions for which each student observer was asked to make judgments. The subjects were asked to follow through with the instructions as they understood them. If they had questions, they were to ask the experiment facilitator to assist them.

In the pretest, the first subject was asked to exit the room and walk down the hall to the water fountain. This subject was instructed to stop at the water fountain and take a drink of water. After taking a drink of water, the first subject was asked to walk back down the hall, re-enter the same room, and then return to the hallway and wait to be asked a series of questions involving the theft of a missing pen. The first subject was instructed to deny any involvement in the theft of this pen. Because the first subject did not take the pen, or participate in the theft of the pen, the first subject was the innocent party. The responses given by this subject to the second set of five questions, the questions pertaining to the mock crime were truthful responses, and the nonverbal behavior of this person was that of a person telling the truth. After the interview, the first subject was asked to take a seat in the hallway outside of the conference room.

The second subject was also asked to exit the room and enter an adjacent room. After entering this room, he or she was to close the door and sit in the chair provided at the table, and wait for instructions about what to do next.

The third subject was to exit the same room, and enter the adjacent room, along with the second subject. After the door was shut, the third subject was instructed to tell the second subject to remove the pen from the table and retain it. From this point, the second subject had possession of the pen; the third subject did not have possession of the pen. Both the second and third subjects were then to take their seats in the hallway and

wait until they were called upon for questioning. The second and third subjects were not innocent because they were both involved in the theft of the pen. At this point in the pretest, all three subjects had completed the instructions given to them relating to the mock crime.

In the pretest, all three subjects were interviewed at the front of the conference room. Each subject was asked the same ten questions, of which, the first five were personal questions pertaining to all three subjects. Subjects were asked to answer the first five questions truthfully. The second five questions were questions pertaining to the mock crime. Subjects were instructed prior to the interviews to deny any involvement in the mock crime. Student observers in the audience were asked to make judgments on each interview. Student observers were also asked to fill out a questionnaire that asked for such demographic information as age, gender, what college they currently attend, as well as their current year in school.

One problem with the pretest design was discovered at the psychology conference. The design made it hard for some people to view the interview. The interviews of the subjects took place at the front of the conference room, in a seated position. This made it difficult for the people in the back of the conference room to view the interviews. To correct this problem, student observers need to be able to have a close-up look at the subjects face in order to make judgments about a subject's nonverbal behavior. For the experiment, videotaped interviews will be used, that display a close-up of the subjects' face and body. This will enable the student observers to view the subject from a frontal view with a closer angle.

Other problems with the pretest design were discovered after reviewing the data collected in the pretest. First, the ratio of male to female student observers was disproportionate. Twenty-eight student observers, or seventy percent of the student observers were females, while only twelve student observers, or thirty percent, were males. This ratio is not representative of the general population and made it difficult to establish a good representative sample.

Second, the gender variation in the subjects used in the pretest was also inconsistent. Two females and one male subject were used in the pilot study. Because of the nature of the variables being analyzed, namely gender differences in accuracy, nonverbal cues used, and skepticism, it was appropriate to use an equal number of male and female subjects. Therefore, when the experiment is conducted, members of both genders will be used in each mock crime; in other words, three males and females will be used in the same mock crime scenario. The design would stay the same, but the genders would not vary within each group. Student observers will be asked to evaluate each scenario, first evaluating one gender, and then the other gender.

The third problem found with the pretest's experimental design was the number of people surveyed. While 40 student observers was a sufficient number for a pretest, it did not represent a large enough sample to allow detailed analysis or to generalize any findings. A larger sample of student observers would be needed to more accurately represent the population being tested: namely, Criminal Justice students at Marshall University. A large sample of at least eighty student observers will be used for the actual research project.

The fourth problem found with the pretest was how to accurately compare the nonverbal cues identified by student observers with the nonverbal cues actually demonstrated by subjects. Since the interviews were not taped, there was no accurate way to compare the nonverbal cues relied upon by student observers with the actual nonverbal cues given off by subjects in the mock crime. For this reason, the interviews for the final experiment will be videotaped prior to conducting the research. Taping the interviews will give the researcher an opportunity to view the interviews to determine what nonverbal cues are actually present during deceptive interviews and non-deceptive interviews. If a student observer indicates that the subject moved in his or her seat, the videotape will establish that the subject did or did not move at all, and the response would not be accepted as a positive correlation for that interview.

The fifth and sixth problems were found in the pretest questionnaire read to the subjects who participated in the mock crime. The interviewer asked twenty questions of each subject, which turned out to be too many questions. Not all the questions needed to be asked. So, the questionnaire used in this pilot study will only include ten questions, five "hot questions" and five questions not related to the mock crime. Hot questions are those questions that are asked to illicit a nonverbal response. The pretest questionnaire should not have included requiring each student observer to make judgments on each subject on every question. For example, if a subject was asked his or her name, student observers judged the truthfulness of this statement by choosing if the subject was either lying or telling the truth. In the final experiment, student observers will not make judgments on the first five questions.

Another problem found in the experimental design used for the pretest was the lack of a reliable measure of skepticism. In the pretest, there was no way to statistically compile data and arrive at a reliable measure of skepticism. So in the experiment, students simply will be asked if they are more "skeptical" of males or females. It is not an open-ended question, but direct and to the point; it also measures skepticism, which was what was lacking in the pretest.

Finally, not only were too many questions asked in the interviews, but too many nonverbal cues were included in the pilot test. For this reason, only those nonverbal cues identified by pretest student observers as closely related to deception will be included in the final questionnaire. The pretest survey included fifteen nonverbal cues and two verbal cues; the study survey will include only those nonverbal cues that scored a sixty-percent or better acceptance rate among student observers in the pretest, those cues are discussed in the section to follow.

The pretest served as a good tool for finding errors, which were then corrected. Because of the problems found with the pretest, measures were taken to alleviate these problems. The survey given to student observers in the present study has less nonverbal behaviors to rate. The gender ratio should not bias the experiment, nor should the gender ratio between student observers judging the interviews. Fewer questions are asked in the interview. Skepticism is a measurable variable. Videotaping the interviews serves as a check on answers and behaviors displayed in response to questions during the interviews. Asking student observers to rate the subjects on each question, as opposed to asking them to rate them overall, serves as a more reliable measure of deception. The next section,

which is entitled "Data Collection/Results," was created to inform the reader of the results of the present study.

Methodology

The present section entitled "Methodology" outlines the specific data collection method used in this study. Most of the research reviewed used some type of experimental design to evaluate such behavior. This section also describes a specific design to evaluate nonverbal behavior. Because nonverbal behavior is a visible variable, the design in this study analyzes how each gender evaluates nonverbal behavior, and focuses on the three variables mentioned in the first section, namely: accuracy, cues, and skepticism. A survey instrument used in conjunction with a video was the method used to collect the data.

In this study, student observers analyzed videotaped interviews and tried to detect which subjects were being deceptive and which subjects were telling the truth. The results from this study were analyzed to see if there was a significant level of difference between males and females in accuracy, selection of nonverbal cues used to detect deception, and the degree to which each gender was skeptical of individuals on the basis of gender. The significance level for comparisons used was the 0.05 level of significance. In the review of literature section, most studies used the .05 level of significance to test the statistical analysis.

Hypotheses

The following statements informed the reader of exactly how each variable was tested, as well as what hypotheses were tested. The first hypothesis was that male student observers would be significantly more accurate in detecting deception by male subjects

than female student observers. A t-test was used to compare the difference in accuracy of male to female student observers in detecting deception in male subjects.

The Null hypothesis to the first hypothesis was that there would be no significant difference in the mean scores of male and female student observers in the accuracy in judging male subjects' deception. This means that both male and female student observers would have similar rates of accuracy in judging male subjects.

The second hypothesis was that female student observers would be significantly better at detecting deception by female subjects than male student observers. A t-test was used to compare the accuracy rates of male and female student observers.

The Null hypothesis to the second hypothesis was that there would be no significant difference between the mean scores of male and female student observers in rates of accuracy in judging female subjects.

The third hypothesis was that male student observers would choose eye movement as an indication of deception significantly more frequently than female student observers in assessing the truthfulness of male subjects. The first step in testing this variable was to calculate the total number of times each gender selected eye movement to aid in detecting deception. The second step required the researcher to watch the interviews and score the interviews to see which cues were actually present during questioning. The third step required the researcher to look at the questions in which a male subject was being interviewed. By using a t-test to compare the cues student observers used with the cues that were actually present during questioning, a level of significance was produced. This level of significance will indicate the accuracy of male

student observers in identifying not only when a cue was present, but also the accuracy of the cue itself in detecting deception.

The Null hypothesis to the third hypothesis was that there would be no significant difference between male and female student observers in the selection of eye movement as an accurate deception cue in the evaluation of male subjects.

Experimental Design

Like many of the studies described in the literature review, this research is based upon an experimental design. The experimental design used two sets of three different subjects in a mock-crime scenario. To eliminate gender bias two different mock crime scenarios were conducted; one with male subjects and one with female subjects. Two subjects in each gender set were asked to perform a specific task within the mock crime. One subject from each gender set was not involved in the mock crime. When the scenario was completed, each subject was asked to participate in an interview. Each interview was videotaped to facilitate detailed observation of nonverbal behaviors of those subjects involved in the mock crime.

A male conducted the interviews. The purpose of the interview was to ask questions about the mock crime designed to elicit some type of nonverbal response from the subject. Prior to the interview, each subject was instructed, verbally and in written instruction, to deny any involvement in the mock crime. This was to implant not only a visual message, but also an auditory message as well. Not all questions in the interviews were directly related to the mock crime. Those questions not related to the mock crime were used to elicit each subject's normal behavior. From this, a student observer could

compare any dishonest response with the honest responses, and make some type of judgment on each subject's behavior. All subjects answered truthfully on the first five questions, but not all subjects answered truthfully on the second five questions. Student observers were aware that the answers to the first five questions in each interview were truthful responses.

These questions were asked in a manner to allow student observers to establish a baseline behavior for each subject. The first five questions asked were those questions that the subject would answer truthfully. The second five questions were those questions upon which each student observer was asked to make judgments. A baseline behavior was that type of behavior that established truthfulness. It allowed the student observer to view a subject under truthful circumstances. The baseline behavior was established by comparing a subject's behavior on the first five questions to the subject's behavior on the second five questions. Once again, student observers were made aware prior to watching the interviews that the answers to the first five questions in each interview were truthful responses. Research studies indicated that the interview process should start with "non-threatening" questions, because this gave observers an opportunity to observe subjects interacting with the interviewer. These questions pertaining to baseline behavior had nothing to do with the mock crime and, therefore, showed how a person reacted to an everyday question, such as a person's name. All subjects were instructed to answer these questions truthfully. The second five questions pertained to the mock crime. These questions were the questions in which subjects were asked to deny any involvement in the mock crime, even if they had involvement in the mock crime. All subjects were to

deny any involvement in the mock crime, which meant that some subjects were fabricating their answers. Student observers knew prior to viewing the tapes that a mock crime had occurred. The researcher informed the student observers that some of the subjects in the interviews fabricated their involvement in the mock crime. (See questions in Appendix "C")

Stage One: The Mock Crime

The first stage of the experiment was the mock crime. First, three males and three females were selected on the basis of availability. No systematic sampling or specific criteria other than gender was employed to choose persons to participate in the mock crime. The first three subjects were each given a different set of written instructions, and instructed to follow the instructions, as they understood them. If the subjects had questions about the procedure, they were to ask the person who gave them the instructions. The subjects were informed that their participation was voluntary and they did not have to participate. If the subjects agreed to participate they were then asked to read over the instructions once again, so they knew what they were being asked to do. If the subjects had declined to participate, they would have been excused from participating from the experiment and another subject chosen. No subjects declined to participate in the experiment. Before the subjects followed through with their instructions, they were asked to read a statement that outlined the experiment in general. The subjects were made aware that their participation was voluntary, and that if they declined to participate the subjects could do so without loss of benefits that were to be provided to them for participating. They also were made aware in this statement that they were asked to deny

involvement in participation of the mock crime. They were asked to not identify themselves during the experiment. The subjects were made aware that they would be videotaped while answering a series of questions pertaining to a theft of an object. The subjects were made aware that university students would view the videotape. The subjects were asked to sign the statement and indicate if they wished to participate.

The first subject was asked to exit the room and walk down the hall to the water fountain. This subject was instructed to stop at the water fountain and take a drink of water. After taking a drink of water, the first subject was asked to walk back down the hall, re-enter the same room, and then return to the hallway and wait to be asked a series of questions involving the theft of a missing pen. The first subject was instructed to deny any involvement in the theft of this pen. Because the first subject did not take the pen, nor did they participate in the theft of the pen, the first subject was the innocent party. The responses given by this subject to the questions pertaining to the mock crime (the second set of five questions) were truthful responses, and the nonverbal behavior of this person was that of a person telling the truth. The remaining two subjects were not innocent because they were both involved in the theft of the pen. After the interview, the first subject was asked to take a seat in the hallway outside of the interview room.

The second subject was also asked to exit the room and enter an adjacent room. After entering this room, he or she was to close the door and sit in the chair provided at the table, and wait for instructions about what to do next.

The third subject was to exit the same room, and enter the adjacent room, along with the second subject. After the door was shut, the third subject was instructed to tell

the second subject to remove the pen from the table and retain it. From this point, the second subject had possession of the pen; the third subject did not have possession of the pen. Both the second and third subjects were then to take their seats in the hallway and wait until they were called upon for questioning. At this point in the experiment, all three subjects had completed the instructions given to them relating to the mock crime.

Each set of instructions, though different, instructed each subject to deny any involvement in the mock crime. Upon completion of the mock crime, the subjects were then asked a series of questions pertaining to the crime. As mentioned before, during the interview, a video camera was used to record the interview. Subjects were aware they were being recorded. The camera was positioned between the interviewer and the subject, so that the interviewer did not appear on camera.

Stage Two: The Interviews

The second stage of the experiment was the interview. Each subject was asked a series of questions. By instruction, those questions pertained to involvement in a mock-crime were responded to with a "no." The questions that were asked of each person were as follows:

1—What is your name?

2—What is the primary color of this book?

3—What is today's date?

4—What is my name?

5—What month is this?

6—Do you know anything about the theft of a pen?

7—Did you take the missing pen?

8—Is the missing pen in this room?

9—What color is the missing pen?

10—Do you have the missing pen upon your person right now?

The questions do not follow any set of interrogative rules. Every question in these interviews was asked in the same tone and in the same way to eliminate bias. Each subject was asked to respond to the questions truthfully, except for those questions pertaining to the mock crime (the last five questions). Every question pertaining to the pen was geared toward the mock crime. Each of these questions was deemed a "hot" question, as they directly pertained to the mock-crime. It was hypothesized that each of the hot questions would illicit different responses from the subjects. For the innocent subject, the subject who went to the water fountain and took a drink, the responses given were the responses of a truthful person. This subject did not have to deny any involvement falsely. For the other two subjects, the responses given were deceptive in nature. These two subjects were involved in the crime. Every question pertaining to the pen targeted the second subject. It was again hypothesized that the responses given by the second subject on questions pertaining to the pen would reveal nonverbal cues that related to deceptive activity. The third subject would reveal nonverbal cues related to deception when the third was asked questions about knowledge of the crime. However, the third subject's answers to two "hot questions" were truthful. Each interview followed the next. Only one interview took place at a time. While one interview took place, the other participants sat outside the "interview room" and waited their turn.

Stage Three: Judgment of the Interviews

Once the videotaped interviews were completed, the next part of the experiment consisted of students observing the interviews. These students were in Criminal Justice classes from Marshall University. The type of sample taken was a purposive sample. All classes were selected from Tuesday Criminal Justice classes. Students who had completed the experiment from an earlier class were asked not to participate a second time.

Before the video was shown, the students in the classroom were handed a questionnaire and asked to answer demographic questions (See Appendix "C"). First, they were asked to indicate their gender. Then, they were then asked to indicate what year they were in school, whether they were a freshman, sophomore, junior, or a senior. They were also asked to indicate their current major, minor, race, age, and whom they were more likely to believe, males or females. They were then asked to indicate whether they had ever been a police officer or had any training in detecting deception. They were reminded that participation was voluntary and that they did not have to participate if they did not wish to do so. They also were reminded that each survey, or questionnaire, would be kept completely confidential, making each student observer anonymous and unidentifiable. Each student observer was asked to not write his or her name anywhere on the survey so that anonymity could be maintained. Student observers were informed that they did not have to answer any or all questions on the questionnaire.

The six nonverbal cues that were selected for the study were chosen based upon the results of the pretest. Those six cues were selected from a possible seventeen cues,

based upon their likelihood of being related to deception. Those cues were chosen because they had an acceptance rate of sixty percent or higher in the initial pretest. In other words, at least sixty percent of the people who participated in the pretest thought those cues were more related to deception than the rest of the cues included in the survey. It was thought that, by eliminating those cues not seen as highly related to deceptive activity, more concentration could be given to those cues that rank higher in importance or relevance. Too many cues were included in the initial pretest; so only those that had a high acceptance rate were included in the final survey instrument. The cues included in this experiment were similar to the cues used in most of the experiments covered in the literature review section.

Before the viewing of the interviews, student observers were made aware that the answers to the first five questions in each interview were truthful for each subject. During the viewing of the interviews, student observers were asked to indicate on each of the second five questions whether they thought the response given by the subject was truthful or deception. If the student observer thought the person in the interview was being truthful, they checked the box indicating a truthful response. If the student observer thought the person in the interview was being deceptive, he or she checked the box indicating a deceptive response. If the student observer thought the person in the interview was being deceptive, he or she was then asked to indicate which nonverbal cues, if any, were present during the response to the question. The student observers were given a choice between six-nonverbal cues (too little eye movement, too much eye movement, blushing, swallowing excessively, eye movement, and shift in seating

position), as well as the choice of saying that none of the cues were present. Student observes were asked to select all nonverbal cues, if any, present during the subject's response. Student observers were asked to rate the second five questions (the "hot questions") on each of the six interviews, making a total of thirty possible judgments per student-observer. Subjects were Criminal Justice students known to other Criminal Justice students. Student observers could corroborate the truthfulness of the answers to some of the first five questions. After viewing the interviews and completing the questionnaire, the student observers were then asked to comment on the procedures of the experiment, so as to make improvements for future experiments on the subject matter.

Variables

There were a number of variables involved in this experiment. The gender of the subjects and the gender of the student observers were the independent variables. They were the parts of the experiment that were being observed. They were not dependent upon any other aspect of the experiment. The dependent variables were (1) the levels of skepticism, (2) the rates of accuracy, and (3) the nonverbal cues used to detect deception. The rates of accuracy were dependent upon the student observers. How well members of each gender performed in regard to accuracy in identifying/detecting deceptive activity determined this level. The level of skepticism is dependent upon the student-observers as well. The level of skepticism was defined as how a student observer was skeptical, or critical of one gender or the other. The nonverbal cues used to detect deceptive activity are dependent upon the student observer and the subjects. These cues were chosen by the student-observers to evaluate the subjects' behaviors.

The student observers of this experiment were criminal justice students. There were a few reasons behind this choice. This group was very accessible, because the experiment was conducted on a college campus, thereby making the students the prime choice for study. The majority of the studies evaluated in the Review of the Literature used college students as experimental subjects; but this was not the only reason behind choosing students for the purpose of this experiment. Criminal Justice students are often people who choose to work in such positions as law enforcement officers, correctional officers, lawyers, and administrators. These types of positions require a keen sense of communication and the ability to detect deception. Without these two qualities, Criminal Justice students would not be as successful as those people who possess communication and lie-detection skills. Therefore, it was anticipated that Criminal Justice students could possess better than average skills at detecting deception. By evaluating criminal justice students, the results would certainly indicate whether these students were suited for the positions mentioned above, as well as whether they could detect deceptive activity with a high rate of success.

The collected data was entered into a computer database, which enabled the researcher to analyze the data. There were 279 initial variables. Most of these variables were collapsed with other variables and recoded to allow meaningful analysis of the different characteristics of the sample selected—students enrolled in Tuesday Criminal Justice classes at Marshall University.

Demographic information was gathered at the beginning of the questionnaire. Age, class rank, major/minor, gender, and the student's ethnic background were the demographic questions asked of each student observer.

Additionally student observers were asked whether they had received training in the detection of deception and whether they had served as a law enforcement officer. This information was requested for the purpose of determining whether those student observers who responded affirmatively to either inquiry demonstrated better skills at detecting deception. In addition, student observers were asked whether they were more likely to believe males or females. The data provided in response to this question provided the basis for determining gender skepticism, one of the hypotheses tested.

The next question on the questionnaire asked student observers to evaluate the videotaped interviews. Student observers were asked to determine whether each of the six subjects was truthful or deceptive on each "hot question" asked by the interviewer. This required a total of thirty responses, five "hot questions" each for six subjects. Student observers were not asked to evaluate the truthfulness of the responses of the initial five questions because the responses were all truthful.

The questionnaire was designed so that if student observers indicated a truthful response to a relevant question by a subject, no further information was elicited. On the other hand, if a student respondent indicated a deceptive response to a relevant question by a subject, he or she also was asked to indicate which, if any, nonverbal cues were present in response to that question. Student observers were given seven options for responding to the second part of the deceptive response: (1) too little eye contact, (2) too

much eye contact, (3) blushing, (4) shift in seating position, (5) swallowing excessively, (6) eye movement, and (7) none of the above. Student observers were instructed to indicate all nonverbal cues that applied.

If, for example, the student was watching the interview of "April," the variable was labeled as "ajudgment." This variable specified the choice made by the student. The second variable specified if the student made a "Correct Judgment" (scored as a "1"), or an "Incorrect Judgment" (scored as a "0"). For each interview, these variables were coded the same, and the questions were answered the same as well. For some interviews, the answers given were all True responses. For others, the answers given were all "Deception" responses. And yet, for others, the answers given were either Truth or Deception. All questions for which student observers did not make judgments were left blank (no response). This did not affect the rates of accuracy, nor did it affect the rates of inaccuracy.

The student observers were given the choice of "Truth" or "Deception" on each question in the interviews. If student observers chose "Truth," they went to the next question. If student observers chose "Deception," they were asked to indicate which nonverbal cues, if any, they had observed during the interview. The student observer was given a choice of seven different cues (1) too little eye contact, (2) too much eye contact, (3) blushing, (4) shift in seating position, (5) swallowing excessively, (6) eye movement, or (7) none of cues present, which enabled the student observer to not select any of the cues mentioned. Blank cells (those cells containing no data), were scored as no response

and appeared in data as “missing” This did not affect the frequency rates of any of the cues.

To compute overall accuracy rates, the responses given on each question were categorized in overall rates of accuracy for each interview. Each interview was labeled according to the subject who was interviewed. For example, if “April” was interviewed, then rates of accuracy on all five questions asked of “April” were categorized in a variable call “aaccruacy.” The judgments made on each interview were calculated in the same way; the labels for each interview were different. The labels were dependent on the subject who was interviewed. To label the accuracy rates of each interview, the first letter of each subject’s name was placed at the beginning of the word “accuracy.” The range of possible correct judgments went from “0.00” to “30.0” (five questions per interview times six interviews equals thirty possible correct judgments).

To compute the frequency of each nonverbal cue, each question on each interview had separate labels for the nonverbal cues. There were six nonverbal cues in all. Each question on each interview contained all seven nonverbal cues that student observers could choose as being present.

CHAPTER IV

Analysis of Data

The purpose of this research was to study gender differences in the detection of deception. The three variables analyzed for this purpose were, (1) accuracy of student observers in determining truth or deception of subjects in a mock-crime, (2) the accuracy of student observers in identifying nonverbal behavior of those subjects associated with deceptive activity, (3) and skepticism of student observers toward one gender or the other. The hypotheses were that: (1) male student observers would be significantly more accurate in the detection of deception by male subjects than female student observers, (2) female student observers would be significantly better at detecting deception by female subjects than male student observers, and (3) male student observers will choose eye movement as an indication of deception significantly more frequently in assessing the truthfulness of male subjects than female student observers. The findings of the study were broken up into two sections: (1) demographic findings and (2) results of the interviews.

Demographic Findings

Of the 101 student observers, sixty-two (61.4 %) were male and thirty-nine (38.4%) were female. Criminal justice majors represented only 58.4 % (n=59) of the population surveyed. The remainder of the population, 36.6% (n=37) were from various other fields of study. Five student observers (5.0%) did not answer the question. One possible explanation for the unexpectedly low number of Criminal Justice majors in Criminal Justice classes surveyed could be due to students' interest in Criminal Justice as

a minor or for elective courses. Marshall University students must select a minor to supplement a student's major course of study. Twelve of the student observers who were not Criminal Justice majors indicated that they were pursuing a minor in Criminal Justice. At least one major, Print Journalism, requires students to take at least one Criminal Justice class (see Appendix "A," entitled "Frequencies").

The third variable analyzed was the variable entitled "Minor." This variable represented the selected minors of the student observers who participated in the study. Seventy-five (75.0%) out of one hundred and one student observers answered this question. Of those who answered, 12 student observers (11.9%) indicated a Criminal Justice minor. So, Criminal Justice majors and minors comprised 70.3% of the total population of student observers. Psychology minors accounted for 27 student observers of the total population of student observers. Other fields of study represented only a small portion of the population of student observers in criminal justice classes. Political science minors represented three student observers (3%) of the population. Sociology minors represented seven student observers (6.9%) of the population of student observers.

The fourth variable analyzed was the variable entitled "class rank." The variable had five values "Freshman," "Sophomore," "Junior," "Senior," and "Grad/Other." The distributions between each class-rank were evenly distributed, except for the "Grad/Other" values. Both the "Freshman" and "Senior" values were represented with twenty-five students (24.8% each), while twenty-three students represented the "sophomore and Junior" values (22.7% each). Only four student observers selected the "Grad/other" value. The under-representation of Grad/other student observers was due to

the fact that student observers were selected from mostly undergraduate courses. Only one split-level undergraduate/graduate class was chosen for inclusion in the research (see Appendix "A").

The last variable from the demographic section of the questionnaire was the age variable. This variable represented the age of the student observers who participated in the study. The expected age range for this variable was between 18 and 24 years of age. This age range represented the average age range of college students. The age range did produce varying results, but the results were as hypothesized, with a majority of the ages falling within the stated parameter. Nine (8.9%) of the student observers were eighteen years of age. Eighteen (17.8%) of the student observers were nineteen years of age. Twenty-one (20.8%) of the student observers were twenty years of age the most represented age range. Twelve (11.9%) of the student observers were twenty-one years of age. Ten (9.9%) of the student observers were twenty-two years of age. Six (5.9%) of the student observers were twenty-three years of age. The remaining age groups had three or less students in each. Most of the remaining age groups consisted of one person. The highest age among the student observers was forty-seven years and the lowest age in the parameter was eighteen years. The lowest age was almost certain, because, traditionally, most students were eighteen years of age before they graduate high school and began college (see Appendix "A").

Results of the Interviews

This section outlined the accuracy of student observers in their judgments of the truthfulness of each suspect in the six interviews, the nonverbal cues student observers

used in making their decisions and the level of skepticism expressed by male and female student observers. All frequency tables are in the Appendix "A."

The first part of this section discusses the dependent variables and their relationship to the independent variable, "Gender." An explanation of each variable is first; a description of the variable's relationship, if any to "Gender," follows. Each interview is compared to the variable "Gender" to calculate accuracy rates for both male student observers and female student observers.

To compute overall accuracy rates, the responses to each question were categorized into overall rates of accuracy for each interview. Each interview was labeled according to the suspect who was interviewed. For example, if "April" was interviewed, then rates of accuracy on all five relevant questions asked of "April" were categorized in a variable called "aacuracy." The judgments made on each interview were calculated in the same way; the labels for each interview were different. The labels were dependent on the person who was interviewed. To label the accuracy rates of each interview, the first letter of each suspect's name was placed at the beginning of the word "accuracy." The range of possible correct judgments was from "0.00" to "30.0" (five question per interview times six interviews = 30 possible correct judgments). Blank cells (those cells containing no data), were left blank (appeared as missing data for the purpose of analysis). This did not affect the frequency of any of the cues. The confidence interval was set at .05 for all tests run.

To compute the frequency of each nonverbal cue, each question on each interview had separate labels for the nonverbal cues. There were seven options from which to

choose when selecting the nonverbal cue. Each relevant question on each interview contained all six nonverbal cues, plus the option to choose no nonverbal cues present. For example, when looking at "April's" interview, the first nonverbal cue given as a choice was "too little eye contact". The remaining nonverbal cue choices were "too much eye contact, eye movement, swallowing excessively, blushing, and shift in seating position". If any were detected by the observer they could be chosen as present. If none of these were present, the student observer had the option of selecting no nonverbal cues present.

The first interview involved the female suspect who did not participate in the mock crime. This suspect provided all truthful answers. There were a total of ten questions asked of the first suspect, but only the last five questions were analyzed. Before the student observers watched the videotape, it was explained to them that the first five responses from each subject were truthful responses.

The name of the first person interviewed was "April" and the name of the variable was "The Accuracy of April's interview." Two possible responses were provided for each question and response. The student observer had the choice of selecting whether the response was truthful or deceptive. The student observer made five judgments on five questions for each interview. April did not have to employ deceit to deny involvement in the mock crime because she was not involved in the mock crime.

Thirty-nine female student observers evaluated April's interview. Six females (15.4%) made zero correct judgments on April's interview. Four females (10.3%) made one correct judgment on April's interview. Four females (10.3%) made two correct judgments, six females (15.4%) made three correct judgments, five females (12.8%)

made four correct judgments, and fourteen females (35.9%) made five correct judgments on April's interview. Female student observers had an overall accuracy rate of 61.5 percent (120/195).

Sixty-two male student observers made judgments on April's interview. Twelve males (19.4%) made zero correct judgments on April's interview. Eight males (12.9%) made one correct judgment on April's interview. Three males (4.8%) made two correct judgments, eight males (12.9%) made three correct judgments, ten males (16.1%) made four correct judgments, and twenty-one males (33.9%) made five correct judgments on April's interview. Male student observers had an overall accuracy rate of 59.0 percent (183/310).

The female student observers were better able to judge another truthful female than the male student observers were, but only by a small percentage. The difference between female student observers and male student observers in the judgment of the female truth-teller was 2.5 percent.

An independent sample t-test was used to compare the mean scores of the male student observers, in comparison to the female student observers. A t score of $t=0.331$, with 84 degrees of freedom. A significance level of 0.741 was obtained, meaning no statistically significant difference between the male and female correct and incorrect scores for this variable.

Table 1

Total Correct Judgments for April's Interview, Independent Sample T-test:

Observers	N	Mean Score
Female	33	3.07
Male	53	2.95

t= 0.331, df 84, 2-tailed significance (p) = 0.741

**P<0.05*

The next interview was of Vicki, the female subject who was instructed to remove the pen from the room. This female subject was deceptive in her response to each of the second five questions asked of her. She had been instructed to deny any involvement in the mock crime.

Thirty-nine females made judgments on Vicki's interview. Twenty-nine female student observers (74.4%) were unsuccessful in making any correct judgments on Vicki's interview. Three female student observers (7.7%) made one correct judgment on Vicki's interview. Two females (5.1%) made two correct judgments on Vicki's interview. Two females made (5.1%) three correct judgments on Vicki's interview. Zero females (0%) made four correct judgments on Vicki's interview, and three females (7.7%) made five

correct judgments on Vicki's interview. Females were able to judge Vicki's interview with an accuracy rate of 14.4 percent (28/195).

Sixty-two male student observers made judgments on Vicki's interview. Twenty-five male student observers (40.3 %) made zero correct judgments on Vicki's interview. Nine male observers (14.5%) made one correct judgment on Vicki's interview, eight male observers (12.9 %) made two correct judgments, three male observers (4.8 %) made three correct judgments, eleven male observers (17.7 %) made four correct judgments, and six male observers (9.7 %) made five correct judgments. Males were able to make judgments with a 38.1 percent (118/310) rate of accuracy.

Male student observers were better able to determine the female who was completely deceptive in her response than were female student observers by a difference of 16.6 percent. An independent sample t-test was used to compare the mean scores of male student observers with that of female student observers. A t value of t= -3.404 was obtained, and the number of degrees of freedom was df=86. A significance level of 0.001 was obtained meaning that a significant statistical difference exists between the mean scores of male and female student observers in their judgments of the female who was completely deceptive. Males were statistically significantly better at making judgments on the female who was completely deceptive, than were female student observers. This would be the opposite of what was hypothesized.

Table 2

Total Correct Judgments of Vicki's Interview, Independent Sample T-test:

Observers	N	Mean Score
Female	10	2.80
Male	37	3.19

t= -3.404, df 86, 2-tailed significance (P) = .001

P<0.05

The third female about whom student observers were asked to make judgments was the female who was involved in the mock crime, but did not remove the pen from the room. The third female subject, Jen, instructed the second female subject, Vicki, to remove the pen from the room. The third female provided a mixture of two truthful and three deceptive responses in her interview. Of the thirty-nine female student observers, three (7.7 %) made zero correct judgments on Jen's interview. No female student observers made one correct judgment on Jen's interview. Sixteen female student observers (41.0 %) made two correct judgments on Jen's interview, twelve females (30.8 %) made three correct judgments, eight females (20.5 %) made four correct judgments, and zero females made correct judgments on all five of the questions asked in Jen's

interview. Overall, female student observers were able to judge the interview of Jen with an accuracy rate of 51.3 percent (100/195).

Of the sixty-two male student observers, none made zero or one correct judgment correctly. Fourteen male student observers (22.6 %) made two correct judgments on Jen's interview, fourteen males (22.6 %) made three correct judgments, eighteen males (29.0 %) made four correct judgments, and four males (6.5 %) made five correct judgments on Jen's interview. Overall, male student observers judged Jen's interview with an accuracy rate of 52.3 percent (162/310).

Male student observers were more accurate in their judgment of Jen's interview than were female student observers by a difference of 1.0 percent. An independent sample t-test was used to compare the mean scores of male student observers with female student observers. A t score of t=-2.016 was obtained, and the degrees of freedom were df=81. A significance level of 0.047 was obtained meaning that a statistically significant difference exists between the mean scores for male student observers and female student observers in their judgments of the female who was partially deceptive. Male student observers were statistically significantly better at making judgments on the female who was partially deceptive, than were female student observers.

Table 3

Total Correct Judgments for Jen's Interview, Independent Sample T-test:

Observers	N	Mean Score
Female	36	2.78
Male	62	2.61

t= -2.016, df 81, 2-tailed significance (P) = 0.047

**P<0.05*

These results did not support the hypothesis that females would be more accurate in determining the interviews of female subjects. It appears from the results that males were statistically more accurate than females in judging female interviews. The next part of the analysis covered the interviews of the male subjects in the mock crime.

Male subjects who participated in the mock crime scenario were given the same set of instructions, as were their female counterparts. The first male subject, Nathan, was not involved in the mock crime. Therefore, all the responses given by this male suspect were all truthful responses. Thirty-nine female student observers made judgments on Nathan's interview. Eleven females (17.7%) made zero correct judgments on Nathan's interview. Nine female student observers (23.1%) made one correct judgment on

Nathan's interview, one female (2.6%) made two correct judgments, two females (5.1%) made three correct judgments, nine females (23.1%) made four correct judgments, and seven females (17.9%) made five correct judgments on Nathan's interview. Overall, females were able to judge Nathan's interview with an accuracy rate of 45.1 percent (88/195).

Sixty-two male student observers made judgments on Nathan's interview. Nineteen males (19.6%) made zero correct judgments on Nathan's interview. Fourteen male student observers (22.6%) made one correct judgment on Nathan's interview, four males (6.5%) made two correct judgments, seven males (11.3%) made three correct judgments, four males (6.5%) made four correct judgments, and fourteen males (22.6%) made five correct judgments on Nathan's interview. Overall, male student observers were able to judge the male truth-teller with an accuracy rate of 41.6 percent (129/310).

Female student observers were more accurate in judging Nathan's interview than were male student observers. The difference between the two groups was 3.5 percent. A t value of t=0.254 was obtained, with the degrees of freedom at df=87. A significance level of 0.800 was obtained, meaning that no statistically significant difference exists between the mean scores of male and female student observers in their judgments of the male who was partially deceptive.

Table 4

Total correct Judgments on Nathan's Interview, Independent Sample T-test:

Observers	N	Mean Score
Female	28	3.14
Male	43	3

t= 0.254, df 87, 2-tailed significance (P) = 0.80

**P<0.05*

The second male subject in the mock crime was the suspect who removed the pen from the room. This subject, Eric, was instructed to deny any involvement in the mock crime. The answers given by this suspect on the last five questions were all deceptive.

Thirty-nine female student observers made judgments on Eric's interview. Fourteen female student observers (35.9%) made zero correct judgments on Eric's interview. Eight female student observers (20.5%) made one correct judgment on Eric's interview, five females (12.8%) made two correct judgements, five females (12.8%) made three correct judgments, four females (10.3%) made four correct judgments, and three females (7.7%) made five correct judgments on Eric's interview. Overall, female student-observers were able to judge Eric's interview with an accuracy rate of 32.8 percent (64/195).

Sixty-two male student observers made judgments on Eric's interview. Twenty-nine males (46.8%) made zero correct judgments on Eric's interview. Nine male student observers (14.5%) made one correct judgment on Eric's interview, four males (6.5%) made two correct judgments, five males (8.1%) made three correct judgments, nine males (14.5%) made four correct judgments, and six males (9.7%) made five correct judgments on Eric's interview. Overall, males were able to judge Eric's interview with an accuracy rate of 31.6 percent (98/310).

Female student observers were more accurate in judging the male deceiver than male student observers, but only by a margin of 1.2 percent. A t value of t=-.120 was obtained, with the degrees of freedom at df=87. A significance level of 0.905 was obtained, meaning that no statically significant difference exists between male and female student observers in their judgment of the male who was completely deceptive.

The third male subject, Matt, had knowledge of the removal of the pen, but did not take the pen. This subject instructed the second suspect to remove the pen from the room, but did not remove the pen himself. This subject was truthful on two questions and deceptive on three questions in his interview.

Table 5

Total Correct Judgments for Eric's Interview, Independent T-test:

Observer	N	Mean Score
Female	25	2.56
Male	33	2.97

t= 0.12, df 87, 2-tailed significance (P) = 0.91

**P<0.05*

Thirty-nine female student observers made judgments on Matt's interview. One female made zero correct judgments (2.6%) on Matt's interview. Two female student observer (5.1%) made one correct judgment on Matt's interview, fifteen females (38.5%) made two correct judgments, eleven females (28.2%) made three correct judgments, seven females (17.9%) made four correct judgments, and three females (7.7%) made five correct judgments on Matt's interview. The overall accuracy rate of female student observers for Matt's interview was 55.4 percent (108/195).

Sixty-two male student observers made judgments on Matt's interview. Seven males (11.3%) made zero correct judgments on Matt's interview. Two male student observer (3.2%) made one correct judgment on Matt's interview, twenty-nine males (46.8%) made two correct judgments, eighteen males (29.0%) made three correct judgments, three males (4.8%) made four correct judgments, and three males (4.8%)

made five correct judgments on Matt's interview. Overall, male student-observers were able to judge the male partial truth-teller/partial deceiver with an accuracy rate of 45.5 percent (141/310).

Female student observers were 9.9 % more accurate in the judgment of Matt's interview, than male student observers. A t value of t=2.050 was obtained, with the degrees of freedom at df=88. A significance level of 0.043 was obtained, meaning that a statistically significant difference exists between male and female student observers in their judgment of the male who was partially deceptive. Females were statistically significantly better at making judgments on the male who was partially deceptive, than were male student observers. Again, this did not support the original hypothesis.

Table 6

Total Correct Judgments with Use of Eye Movement on Matt's Interview, Independent Sample T-test:

Observers	N	Mean Score
Female	38	2.84
Male	55	2.56
t= 2.05, df 88, 2-tailed significance (P) = 0.04		

**P<0.05*

Overall accuracy rates were calculated by adding all correct judgments made and dividing that number by the total possible correct judgments. Since each student observer

was asked to make a judgment on five questions, and was asked to watch six interviews, each student observer was asked to make a total of thirty judgments. Because of the unequal distribution of the of the student observers across gender lines, the number of judgments per gender is different, but accuracy rates were calculated based upon the number of judgments, not the number of student observers.

Female student observers made a total of 1170 judgments. Of these 1170 judgments, female student observers were able to make 506 correct judgments, with an accuracy rate of 43.7 percent. Male student observers made 1860 judgments, 831 of which were correct judgments, with a 44.8 percent rate of accuracy.

Overall, male student observers were more successful in making correct judgments when combining all three types of the interviews, namely: truths, partial truths/partial deceptions, and deceptions. The difference between male student observers and female student-observers was not significant. In fact, male student observers were more successful in making judgments by a rate of point eight (0.8%) percent. The overall rate of accuracy of male and female student observers combined (1357/2610, 44.8 %) was less than fifty percent.

An independent sample t-test was used to compare the mean scores of male and female student observers in their overall accuracy rates in the judgment of all the subjects who were interviewed. A t score of t=0.201 was obtained, with the df=73. A significance level of 0.290 was obtained, meaning that no statistically significant difference exists between male and female student observers in the overall accuracy rates of all the

subjects who participated in the mock crime. Gender does not appear to have had a substantial impact on accuracy rates in determining truthfulness or deception.

Female student observers were able to judge female subjects with an accuracy rate of 42.4 percent, 248 correct judgments out of a possible 585 judgments. Male student observers were able to judge female subjects with an accuracy rate of 49.8 percent, 463 correct judgments out of a possible 930 judgments. Males were overall more accurate in the judgment of female subjects than female student observers.

An independent sample t-test was used to compare the mean scores of male and female student observers in the judgment of all female subjects who participated in the mock crime. A t test score of t=-2.235 was obtained, with the degrees if freedom at df=76. A significance level of 0.028 was obtained, meaning that a statistically significant difference exists between the mean scores of male and female student observers in their judgments of female subjects. Males were significantly, statistically better at making judgments on female subjects, than were female student observers.

Table 7

Total Correct Judgments on All Female Subjects Combined, Independent Sample T-test:

Observers	N	Mean Score
Female	39	13.0
Male	62	13.4

t= 2.24, df 76, 2-tailed significance (P) = 0.03

**P<0.05*

Male student observers were able to judge male subjects with an accuracy rate of 39.6 percent, 368 correct judgments out of a possible 930 judgments. Female student observers were able to judge male subjects with an accuracy rate of 44.4 percent, 260 correct judgments out of a possible 585 judgments. Female student observers were overall more accurate in the judgment of male subjects than male student observers.

An independent sample t-test was used to compare the mean scores for male and female student observers in their judgments of male subjects. A t value of 0.650 was obtained, with the degrees of freedom at df=83. A significance level of 0.517 was obtained, meaning that no statistically significant difference exists between male and female student observers in their judgments of male subjects.

Table 8

Total Correct Judgments on All Male Subjects Combined, Independent T-test:

Observers	N	Mean Score
Female	39	6.67
Male	62	5.94

t= 0.65, df 83, 2-tailed significance (P) = 0.52

**P<0.05*

The overall accuracy rate of female student observers in the judgment of male subjects in the mock crime was more accurate than male student observers. In all three interviews of male subjects, female student observers were more accurate than male student observers in the judgment of male suspects in the mock crime. The hypothesis that males would be more accurate than females in the judgment of male suspects in a mock crime was incorrect. Just the opposite was true for females. As it turned out, the first two hypotheses were incorrect.

The highest rates of accuracy were produced for the female truth-teller (April) and for the female partial truth/partial deception (Jen). The lowest rates of accuracy occurred for both the deceptive female (Vicki) and deceptive male (Eric). Success rates were higher for accurately identifying truth tellers than for identifying deceivers.

Accuracy and the Use of Eye Movement

The accuracy of the use of the eye movement was low compared to the overall accuracy rates for both male and female student observers. When looking at the interviews, the interviewer scored the interviews as follows: if eye movement was present, and the student observer correctly identified the cue as being present, as well as correctly identified whether the subject was deceptive, the student observer received a point.

When looking at all six interviews, there were a total of 30 questions for each student observer to make judgments on. Of those thirty questions, the subjects answered sixteen questions untruthfully. Of those sixteen questions, eye movement was present during eleven of those questions.

Two subjects (April and Nathan) were completely truthful in their responses during their interviews, and therefore, all nonverbal behaviors for those two subjects were not analyzed. Four subjects (Vicki, Jen, Eric, and Matt) had some deceptive responses in their interviews, and would be subject to further analysis.

Vicki was the subject who provided all deceptive responses in her interview. Vicki had three questions in which she had eye movement. On questions 7, 8, and 9, Vickie displayed eye movement during her responses to these questions. Since sixty two male student observers made judgments on her interviews, then there would have been a possible point total of 186 total correct judgments on these questions. Male student observers made 47 correct judgments with the use of eye movement. Males were able to

accurately identify the nonverbal cue, and make a correct judgment on these questions with a 25.3 % of accuracy.

There were 39 female student observers making judgments on Vicki's interview. There were a total of 117 possible correct judgments on Vicki's interview. Female student observers made 17 correct judgments with the use of eye movement. Female student observers were able to accurately identify the a nonverbal cue, and make a correct judgment on these questions with an accuracy rate of 14.5%

An independent sample t test was used to compare the mean scores of male and female student observers on their use of eye movement, and correct judgment of the female subject who was completely deceptive. A t value of t=-2.219 was obtained, with the degrees of freedom at df=88. A significance level of 0.029 was obtained, meaning that a statically significant difference exists between male and female student observers in their use of eye movement, when making correct judgments on the female subject who was completely deceptive. Male student observers were statistically significantly better at using eye movement and correctly making judgments on the female subject who was completely deceptive.

Table 9

Total Correct Judgments with Use of Eye Movement for Vicki's Interview, Independent Sample T-test:

Observers	N	Mean Score
Female	39	0.44
Male	62	0.76
t= -2.219, df 88, 2-tailed significance (P) = 0.30		

**P<0.05*

Jen was the subject who was deceptive on questions 7, 8, and 9 in her interview. On questions 8 and 9, Jen displayed eye movement in her responses to the questions. The 62 male student observers had the possibility to make 124 judgments correctly. Males were able to identify a nonverbal cue, and accurately judge Jen's interview in 33 of the 124 chances, which is an accuracy rate of 26.6%.

The 39 female student observers had the possibility to make a total of 78 correct judgments on Jen's interviews on questions 8 and 9. Female student observers were able to accurately identify a nonverbal cue, and correctly judge Jen's interview 25 times. Female student observers had an accuracy rate of 32.1%.

An independent sample t-test was used to compare the mean scores of male and female student observers in their use of eye movement, and correct judgment of the female subject who was partially deceptive. A t score of t=0.527 was obtained, with the

degrees of freedom at df=88. A significance level of 0.600 was obtained, meaning that no statistically significant difference exists between male and female student observers in their use of eye movement, when correctly making a judgment of the female subject who was partially deceptive.

Eric was the subject who had five deceptive responses in his interview. Eric had eye movement in all five questions. The 62 male student observers had the possibility to make a total of 310 correct judgments on Eric's interview on question six, seven, eight, nine, and ten. Male student observers were able to accurately identify the nonverbal cue, and correctly make a judgment in Eric's interview 35 times, which is an 11.3% rate of accuracy.

The 39 female student observers had the possibility to make a total of 195 correct judgments on Eric's interview on questions 6, 7, 8, 9, and 10. Female student observers were able to accurately identify, and correctly make a judgment on Eric's interview 16 times. This computes to an 8.2% percent of accuracy.

An independent sample t-test was used to compare the mean scores of male and female student observers in their use of eye movement, when correctly making a judgment on the male subject who was completely deceptive. A t score of t=-1.019 was obtained, with the degrees of freedom at df=87. A significance level of 0.311 was obtained, meaning that no statistically significant difference exists between the mean scores of male and female student observers in their use of eye movement when correctly making a judgment on the male subject who was completely deceptive.

Table 10

Total Correct Judgments on Eric's Interview, Independent Sample T-test:

Observers	N	Mean Score
Female	39	0.41
Male	62	0.56

t= 1.02, df 87, 2-tailed significance (P) = 0.31

**P<0.05*

Matt was the subject who had three questions in which he answered untruthfully. Matt had eye movement on one of those questions. The 62 male student observers had the possibility to make a total of 62 correct judgments on Matt's interview in question eight. Male student observers were able to accurately use a nonverbal cue, and correctly make a judgment 12 times. This is an accuracy rate of 19.4%.

The 39 female student observers had the possibility of making a total of 39 correct judgments on Matt's interview on question eight. Female student observers were able to accurately identify and correctly judge Matt's interview 13 times, which is an accuracy rate of 33.3%.

An independent sample t-test was used to compare mean scores of male and female student observers in their use of eye movement, when correctly making a judgment on the male subject who was partially deceptive. A t score of t=0.891, with the degrees of freedom at df=88. A significance level of 0.375 was obtained, meaning that no statistically significant difference exists between male and female student observers in their use of eye movement, when correctly judging the male subject who was partially deceptive.

Table 11

Total Correct Judgments with Use of Eye Movement for Matt's Interview, Independent Sample T-test:

Observer	N	Mean Score
Female	39	0.41
Male	62	0.19

t= 0.90, df 88, 2-tailed significance (P) = 0.38

**P<0.05*

During the interviews of the female subjects, male student observers were able to accurately use eye movement, and correctly judge the female interviews with an accuracy rate of 25.3% (80/316). Female student observers were able to judge the same interviews with an accuracy rate of 21.5% (42/195).

An independent sample t-test was used to compare the mean scores of male and female student observers in their use of eye movement, when correctly making a judgment on female subjects who displayed eye movement, and were deceptive when answering a question. A t score of t=-1.379, with the degrees of freedom at df=85. A significance level of 0.913 was obtained, meaning that no statistically significant difference exists between male and female student observers in their use of eye movement, when making a correct judgment on a female subject who displayed eye movement, and were deceptive when answering a question.

During the interviews of the male subjects, male student observers were able to accurately use a nonverbal cue and correctly judge the male interviews with an accuracy rate of 12.8% (47/366). Female student observers were able to judge the same interviews with an accuracy rate of 12.4% (29/234).

An independent sample t-test was used to compare the mean scores of male and female student observers in their use of eye movement, when making a correct judgment on male subjects who displayed eye movement, and were deceptive when answering a question. A t score of t=-0.110 was obtained, with the degrees of freedom at df=85. A significance level of 0.913 was obtained meaning that no statistically significant difference exists between male and female student observers in their use of eye

movement, when making a correct judgment on male subjects who displayed eye movement, and were deceptive when answering a question.

Skepticism

The last variable analyzed was skepticism. Of the one hundred one student observers, seventy-seven student observers (77/101—76.2%) indicated that they were not more skeptical of one gender or the other. These student observers selected the choice "neither," indicating that they were possibly equally skeptical of both male and female persons. As for the remaining twenty-four students, six females thought they were more likely to believe females than males, whereas only one female was more likely to believe a male more than a female. Seven males were more likely to believe other males, whereas eight males said that they were more likely to believe females.

A measurement of central tendency also was calculated for the variable "skepticism." Student observers were given three possible choices for the skepticism variable. Student observers could choose to be more likely to believe females (scored as a "1"), males (scored as a "2"), or neither gender (scored as a "3"). The two student observers who left this question blank were not scored. The measure of central tendency was the mode. The mode was 3 which was the choice of "neither." The distribution for the variable "skepticism" had a negative skewness (-1.747), which indicated that the majority of the scores fell in the upper end of the range ($x>2$). The distribution had a positive kurtosis (1.761), which indicated that the distribution was flatter than a normal distribution.

To summarize, overall accuracy rates for student observers were below fifty percent, indicating that student observers might not be good lie detectors. Experience could be an important factor in the accuracy rates of lie detectors. Male student observers were overall better at making judgments (831/1860—44.8%) than female student observers were at making judgments (506/1170—43.7%).

The mean score of the judgements made by female student observers was higher than the mean score of the judgments made by male student observers on the interviews of male suspects in the mock crime. On the other hand, the mean score of the judgments made by male student observers was higher than the mean score of judgments made by female student observers on the interviews of female suspects in the mock crime.

The findings suggest that the differences found for male and female students observers were the opposite of originally hypothesized. Males were found to be better at detecting deception in the female subjects, than were female student observers. Of these findings, males were significantly better on three different occasions: Males were significantly better in detecting deception on the female who was partially deceptive, and the completely deceptive female. Males also were significantly better when using eye movement in detecting deception in the female who was completely deceptive. Females were significantly better at detecting deception in the male subject who was partially deceptive. These findings suggest that the idea of courtship and the pursuit of a partner prepare males and females to scrutinize more accurately the opposite gender. In this scrutinizing process, males are better able to detect deceit in females, better than females, because of their need to attract a mate, retain a mate, and reproduce with a mate

(Sternberg and Barnes, 1988). Just the same would be true for female student observers in their detection of deception in male subjects, with greater accuracy than male student observers.

Both male and female student observers chose eye movement most frequently in aiding them in the detection of deception. The second most chosen cue by both male and female student observers was shift in seating position. Swallowing excessively and blushing were both rated by male and female student observers as the cue used the least in aiding student observers in the detection of deception.

Rates of skepticism did not produce results as hypothesized. The hypothesis was that each gender would clearly be more skeptical of the other gender. Results indicated that student observers reported that they were not skeptical of the opposite gender with a high frequency rate. In fact, seventy-seven student observers indicated that they were not skeptical of either gender.

The interviews were videotaped and analyzed to monitor the display of nonverbal cues by suspects in the mock crime. After viewing the interviews, three interesting findings were noted. The use of nonverbal cues did not vary much across gender; and it was not consistent within a gender. It was, however, consistent in regard to the suspects' role. The truthful subject from each gender class was noted to have better eye contact with the interviewer: in fact, with the exception of two questions (one by each of the truthful subjects), both truthful subjects maintained eye contact throughout the entire interview. There was no eye movement from either truthful subject, aside from the eye movement already mentioned in those two questions mentioned above.

When looking at the interviews of the partially truthful/partially deceptive suspects, and the interview of the completely deceptive suspect, and comparing these interviews to both of the interviews of the truthful subjects, an additional finding was noted. Both subjects in the partially truthful/partially deceptive role and both subjects in the completely deceptive role were found to use more shift in their seating position and have more eye movement than the two truthful subjects. Shift in seating position was noted only two times from the truthful male subject, and was not present in any of the five questions asked of the truthful female subject. Eye movement was noted one time each for both the female and the male truthful subject. Eye movement was noted eleven times for both the male and female partially deceptive/partially truthful and deceptive subject.

This finding could indicate that a person who has nothing to conceal is under less stress and displays less nonverbal cues. This also could indicate that a person who has something to conceal is under more stress and displays more nonverbal cues. Ekman (1974) called this masking. According to Ekman, when a person is trying to conceal or hide an answer, he or she will attempt to conceal the verbal message by telling a lie, and attempt to conceal any nonverbal cues. When concealing a nonverbal message, subjects will conceal only part of their nonverbal cues. Ekman called this leakage, which occurs when a subject conceals only part of their nonverbal cues.

There are several other tables continued in Appendix "B," which describe the statistics relating to overall accuracy with the use of eye movement in each interview. Also in Appendix B, there are tables that describe the statistics relating to the overall

accuracy in each interview, and the overall accuracy of each gender. Appendix “C” contains the actual survey used by student observers in making their judgment of each interview. Appendix “D” contains the instructions given to each subject who participated in the mock crime scenario.

CHAPTER V

SUMMARY

The purpose of this paper was to decide whether gender played a role in the detection of deception, as well as which nonverbal cues, if any, were most useful in the detection of deception. Deception and nonverbal behavior were topics of study that have been heavily researched over the past thirty years, dating back to one of the first studies conducted by the pioneer of this subject, Ekman. Ekman (1969) began his research by first looking at female nursing students and how their reactions to films were seen as truthful and deceptive. Ekman claimed that the body was a better indicator of deception than the face. Other researchers made claims refuting Ekman's claim, saying that the face was a better indicator of deception than the body (Zuckerman, Spiegel, Depaulo, & Rosenthal, 1982). As more research perspectives developed, researchers began to specify certain aspects of the body as better indicators of deception. Researchers have tried to pinpoint one or more nonverbal cues as being the best indicators of deceptive activity, without consistent success.

Ekman (1969) had stated that one should not rely upon nonverbal cues to detect deceptive activity, unless one fully realized the context of their usage. Other factors can contribute to a person's response to questioning. Stress and other environmental factors, such as temperature, might also contribute to a person's response to certain stimuli. Understanding how a person normally reacts to questions was also a key aspect to understanding deception (Ekman, 1969). If a person who normally makes eye contact with someone looks in a different direction when being questioned, this person might be

perceived as deceitful. But, if a person who does not normally make eye contact makes eye contact when being questioned about some crime, this person also might be perceived as deceitful. This scenario was just one way to describe how nonverbal cues could be taken out of context.

The literature reviewed concentrated on nonverbal behavior. Very few, if any, of the researchers previously discussed mentioned the possibility that gender differences may exist in the detection of deception. This was a new area of concentration that could prove to be useful to the criminal justice field. By analyzing these differences, one could determine that males, for example, might be more accurate in determining the validity of a response from a male.

The methodology for collecting data involved two parts: (1) the mock crime scenario, which resulted in six videotaped interviews, and (2) a survey to collect data from student observers. Results were calculated through the use of the Statistical Package for the Social Sciences (SPSS).

The results of the pilot study indicated that there are gender differences in detecting deception--albeit small differences. Male student observers were more accurate when judging the female subject mock crime interviews. In the judgment of female subjects, male student observers had an accuracy rate of 50.6%, whereas female student observers had an accuracy rate of 44,1%, a difference of 6.5%. Female student observers were more accurate when making judgments on the male subject mock crime interviews. In the judgment of male suspects, female student observers had an accuracy rate of 44.4%, whereas male student observers had an accuracy rate of 39.6%, a difference of

4.8%. Both genders selected eye movement as the cue they felt had the best indication of deceptive activity. The skepticism variable did not produce the anticipated result. Most student observers indicated that they were skeptical of neither gender more than the other gender. The hypothesis supported by data from the pilot study was that eye movement would be the most frequently used nonverbal cue in the detection of deception. All other hypotheses were not supported by the data collected in this study.

With the detection of deception, there are no clearly defined boundaries for rates of accuracy. Accuracy rates could increase with experience and training, which could be why student observers had low accuracy rates. Maybe these accuracy rates are not low at all. These rates seem to be indicative of past rates of accuracy in other studies. Vrij (1992) asked 91 police detectives to watch fragments of videos of twenty people who were instructed to either be deceptive or tell the truth. The accuracy rate of the detectives was 49 percent (Vrij, 1992). This is close to the same overall accuracy rate of student observers. In another study, Vrij (1996) compared rates of accuracy of prison inmates with those of law enforcement officials, and corrections' officers. Rates of accuracy for prisoners were higher than for the other groups. It could be that work experience does not affect rates of accuracy, but other kinds of experiences do, such as socialization or one's surroundings (Vrij, 1996). In a study conducted on accuracy rates of different groups, college students were found to have an accuracy rate of 52.8 % (Ekman and O'Sullivan, 1991).

The nonverbal cue for assessing truthfulness most frequently used by student observers was eye movement. Both male and female student observers indicated that eye

movement was associated with deceptive activity. Eye movement was mentioned in at least a small portion in nearly all studies in the literature review. Different operational definitions for eye movement occurred in these studies; however, eye movement appears to be the dominant nonverbal cue used in relation to deceptive activity.

The videotape that was constructed made it difficult to monitor blushing and swallowing excessively. These two nonverbal cues were hard to see and were, therefore, hard to detect. Student observers could have been concentrating on the use of one of these two cues, and could have missed more obvious ones like eye movement or shift in seating position. Too many cues should have made it confusing for student observers to pick up on the use of a cue. Future studies could concentrate on one or two nonverbal cues, instead of six, as did this pilot study.

This pilot study allowed the researcher to analyze how genders differed not only in their accuracy rates in the detection of deception and use of nonverbal cues to detect deception, but also how each gender displayed nonverbal cues as well. Suspects in certain roles displayed similar patterns of nonverbal cues during the interviews. More research should be done in the use of cues by subjects in similar scenarios such as the one presented in this pilot study.

Future Research

Future research in the subject area of detection of deception is endless. There are many different variables that can be attributed to why someone is deceptive, what causes them to be deceptive, and what a person does when they are deceptive. Researchers could concentrate on differences in the length of time it takes a truthful person to answer a

question, and compare this to the length of time it takes a deceptive person to answer a question, and compare the mean scores of each group to determine if significant differences exist between these two groups. Researchers could look at cultural differences in the way subjects interact in deceptive transactions, such as if one culture uses more of one nonverbal cue than other cultures in deceptive transactions. A research study could look at the nonverbal cues used by truthful subjects, and compare those nonverbal cues used to the nonverbal cues used by deceptive subjects, and compare for differences or similarities. The combination of different scenarios is unlimited in regard to what to study. One thing remains certain: new studies will be developed that research different avenues of nonverbal behavior, and their relationship to the detection of deception. These future studies will borrow parts of past research studies, and implement new ideas in an attempt to explain the intriguing, yet perplexing subject of nonverbal behavior, and its relationship to deception.

Appendix A: Frequencies

Table A1

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18.00	9	8.9	10.0	10.0
	19.00	18	17.8	20.0	30.0
	20.00	21	20.8	23.3	53.3
	21.00	12	11.9	13.3	66.7
	22.00	11	10.9	12.2	78.9
	23.00	6	5.9	6.7	85.6
	24.00	2	2.0	2.2	87.8
	25.00	2	2.0	2.2	90.0
	26.00	1	1.0	1.1	91.1
	27.00	1	1.0	1.1	92.2
	28.00	3	3.0	3.3	95.6
	31.00	1	1.0	1.1	96.7
	33.00	1	1.0	1.1	97.8
	47.00	1	1.0	1.1	98.9
	88.00	1	1.0	1.1	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table A2

Class Rank

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	freshman	25	24.8	25.3	25.3
	sophomore	23	22.8	23.2	48.5
	junior	23	22.8	23.2	71.7
	senior	24	23.8	24.2	96.0
	grad/other	4	4.0	4.0	100.0
	Total	99	98.0	100.0	
Missing	System	2	2.0		
Total		101	100.0		

Table A3

Major

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Criminal Justice	59	58.4	61.5	61.5
	Other	37	36.6	38.5	100.0
	Total	96	95.0	100.0	
Missing	System	5	5.0		
Total		101	100.0		

Table A4

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	39	38.6	38.6	38.6
	Male	62	61.4	61.4	100.0
	Total	101	100.0	100.0	

Appendix B: Statistical Frequencies

Table B1

Correct Judgment for April Question One

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	33	32.7	34.4	34.4
	correct judgment	63	62.4	65.6	100.0
	Total	96	95.0	100.0	
Missing	System	5	5.0		
Total		101	100.0		

Table B2

Correct Judgment for April Question Two

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	28	27.7	31.1	31.1
	correct judgment	62	61.4	68.9	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B3

Correct Judgment for April Question Three

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Incorrect judgment	45	44.6	51.1	51.1
	Correct judgment	43	42.6	48.9	100.0
	Total	88	87.1	100.0	
Missing	System	13	12.9		
Total		101	100.0		

Table B4

Correct Judgment for April Question Four

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	30	29.7	34.1	34.1
	correct judgment	58	57.4	65.9	100.0
	Total	88	87.1	100.0	
Missing	System	13	12.9		
Total		101	100.0		

Table B5

Correct Judgment for April Question Five

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Incorrect judgment	13	12.9	14.4	14.4
	Correct judgment	77	76.2	85.6	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B6

Correct Judgment for Jen Question One

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Incorrect judgment	61	60.4	67.0	67.0
	Correct judgment	30	29.7	33.0	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B7

Correct Judgment on Jen Question Two

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Incorrect judgment	24	23.8	26.4	26.4
	Correct judgment	67	66.3	73.6	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B8

Correct Judgment for Jen Question Three

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Incorrect judgment	42	41.6	46.2	46.2
	Correct judgment	49	48.5	53.8	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B9

Correct Judgment for Jen Question Four

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	34	33.7	37.4	37.4
	Correct judgment	57	56.4	62.6	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B10

Correct Judgment on Jen Question Five

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Incorrect judgment	12	11.9	13.6	13.6
	Correct judgment	76	75.2	86.4	100.0
	Total	88	87.1	100.0	
Missing	System	13	12.9		
Total		101	100.0		

Table B11

Correct Judgment on Vickie Question One

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	67	66.3	72.0	72.0
	correct judgment	26	25.7	28.0	100.0
	Total	93	92.1	100.0	
Missing	System	8	7.9		
Total		101	100.0		

Table B12

Correct Judgment on Vickie Question Two

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Incorrect judgment	68	67.3	75.6	75.6
	Correct judgment	22	21.8	24.4	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B 13

Correct judgment on Vickie Question Three

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	61	60.4	67.8	67.8
	Correct judgment	29	28.7	32.2	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B14

Correct Judgment on Vickie Question Four

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	55	54.5	61.1	61.1
	correct judgment	35	34.7	38.9	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B15

Correct Judgment for Vickie Question Five

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	65	64.4	73.0	73.0
	Correct judgment	24	23.8	27.0	100.0
	Total	89	88.1	100.0	
Missing	System	12	11.9		
Total		101	100.0		

Table B16

Correct Judgment on Nathan Question One

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Incorrect judgment	43	42.6	46.2	46.2
	correct judgment	50	49.5	53.8	100.0
	Total	93	92.1	100.0	
Missing	System	8	7.9		
Total		101	100.0		

Table B17

Correct Judgment on Nathan Question Two

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	47	46.5	51.6	51.6
	correct judgment	44	43.6	48.4	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B18

Correct Judgment on Nathan Question Three

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	59	58.4	64.8	64.8
	correct judgment	32	31.7	35.2	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B19

Correct Judgment on Nathan Question Four

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Incorrect judgment	52	51.5	57.1	57.1
	Correct judgment	39	38.6	42.9	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B20

Correct Judgment on Nathan Question Five

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Incorrect judgment	36	35.6	39.6	39.6
	correct judgment	55	54.5	60.4	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B21

Correct Judgment on Matt question One

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	56	55.4	59.6	59.6
	correct judgment	38	37.6	40.4	100.0
	Total	94	93.1	100.0	
Missing	System	7	6.9		
Total		101	100.0		

Table B22

Correct Judgment on Matt Question Two

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	35	34.7	38.0	38.0
	Correct judgment	57	56.4	62.0	100.0
	Total	92	91.1	100.0	
Missing	System	9	8.9		
Total		101	100.0		

Table B23

Correct Judgment on Matt Question Three

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	40	39.6	44.4	44.4
	correct judgment	50	49.5	55.6	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B24

Correct Judgment on Matt Question Four

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	51	50.5	56.0	56.0
	Correct judgment	40	39.6	44.0	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B25

Correct Judgment on Matt Question Five

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	27	26.7	29.7	29.7
	Correct judgment	64	63.4	70.3	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B26

Correct Judgment for Eric Question One

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	62	61.4	67.4	67.4
	correct judgment	30	29.7	32.6	100.0
	Total	92	91.1	100.0	
Missing	System	9	8.9		
Total		101	100.0		

Table B27

Correct Judgment for Eric Question Two

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Incorrect judgment	64	63.4	70.3	70.3
	Correct judgment	27	26.7	29.7	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B28

Correct Judgment on Eric Question Three

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	54	53.5	59.3	59.3
	correct judgment	37	36.6	40.7	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B29

Correct Judgment on Eric Question Four

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Incorrect judgment	65	64.4	70.7	70.7
	Correct judgment	27	26.7	29.3	100.0
	Total	92	91.1	100.0	
Missing	System	9	8.9		
Total		101	100.0		

Table B30

Correct Judgment on Eric Question Five

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	incorrect judgment	52	51.5	56.5	56.5
	correct judgment	40	39.6	43.5	100.0
	Total	92	91.1	100.0	
Missing	System	9	8.9		
Total		101	100.0		

Table B31

Correct Judgment with Use of Eye Movement April Question One

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	95	94.1	99.0	99.0
	1.00	1	1.0	1.0	100.0
	Total	96	95.0	100.0	
Missing	System	5	5.0		
Total		101	100.0		

Table B32

Correct Judgment with Use of Eye Movement April Question Two

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	87	86.1	96.7	96.7
	1.00	3	3.0	3.3	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B33

Correct Judgment with Use of Eye Movement April Question Three

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	82	81.2	93.2	93.2
	1.00	6	5.9	6.8	100.0
	Total	88	87.1	100.0	
Missing	System	13	12.9		
Total		101	100.0		

Table B34

Correct Judgment with Use of Eye Movement April Question Four

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	88	87.1	100.0	100.0
Missing	System	13	12.9		
Total		101	100.0		

Table B35

Correct Judgment with Use of Eye Movement April Question Five

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	89	88.1	98.9	98.9
	1.00	1	1.0	1.1	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B36

Correct Judgment with Use of Eye Movement Jen Question One

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	80	79.2	87.9	87.9
	1.00	11	10.9	12.1	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B37

Correct Judgment with Use of Eye Movement Jen Question Two

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	86	85.1	94.5	94.5
	1.00	5	5.0	5.5	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B38

Correct Judgment with Use of Eye Movement Jen Question Three

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	68	67.3	74.7	74.7
	1.00	23	22.8	25.3	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B39

Correct Judgment with Use of Eye Movement Jen Question Four

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	58	57.4	63.7	63.7
	1.00	33	32.7	36.3	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B40

Correct Judgment with Use of Eye Movement Jen Question Five

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	85	84.2	96.6	96.6
	1.00	3	3.0	3.4	100.0
	Total	88	87.1	100.0	
Missing	System	13	12.9		
Total		101	100.0		

Table B41

Correct Judgment with Use of Eye Movement Vicki Question One

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	80	79.2	86.0	86.0
	1.00	13	12.9	14.0	100.0
	Total	93	92.1	100.0	
Missing	System	8	7.9		
Total		101	100.0		

Table B42

Correct Judgment with Use of Eye Movement Vicki Question Two

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	76	75.2	84.4	84.4
	1.00	14	13.9	15.6	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table 43

Correct Judgment with Use of Eye Movement Vicki Question Three

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	69	68.3	76.7	76.7
	1.00	21	20.8	23.3	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B44

Correct Judgment with Use of Eye Movement Vicki Question Four

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	62	61.4	68.9	68.9
	1.00	28	27.7	31.1	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B45

Correct Judgment with Use of Eye Movement Vicki Question Five

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	72	71.3	80.9	80.9
	1.00	17	16.8	19.1	100.0
	Total	89	88.1	100.0	
Missing	System	12	11.9		
Total		101	100.0		

Table B46

Correct Judgment with Use of Eye Movement Nathan Question One

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	92	91.1	98.9	98.9
	1.00	1	1.0	1.1	100.0
	Total	93	92.1	100.0	
Missing	System	8	7.9		
Total		101	100.0		

Table B47

Correct Judgment with Use of Eye Movement Nathan Question Two

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	89	88.1	97.8	97.8
	1.00	2	2.0	2.2	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B48

Correct Judgment with Use of Eye Movement Nathan Question Three

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	90	89.1	98.9	98.9
	1.00	1	1.0	1.1	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B49

Correct Judgment with Use of Eye Movement Nathan Question Four

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	89	88.1	97.8	97.8
	1.00	2	2.0	2.2	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table 50
Correct Judgment with Use of Eye Movement Nathan Question Five

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	89	88.1	97.8	97.8
	1.00	2	2.0	2.2	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B51

Correct Judgment with Use of Eye Movement Matt Question One

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	77	76.2	81.9	81.9
	1.00	17	16.8	18.1	100.0
	Total	94	93.1	100.0	
Missing	System	7	6.9		
Total		101	100.0		

Table B52

Correct Judgment with Use of Eye Movement Matt Question Two

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	91	90.1	98.9	98.9
	1.00	1	1.0	1.1	100.0
	Total	92	91.1	100.0	
Missing	System	9	8.9		
Total		101	100.0		

Table B53

Correct Judgment with Use of Eye Movement Matt Question Three

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	63	62.4	70.0	70.0
	1.00	27	26.7	30.0	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B54

Correct Judgment with Use of Eye Movement Matt Question Four

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	73	72.3	80.2	80.2
	1.00	18	17.8	19.8	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B55

Correct Judgment with Use of Eye Movement Matt Question Five

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	88	87.1	96.7	96.7
	1.00	3	3.0	3.3	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B56

Correct Judgment with Use of Eye Movement Eric Question One

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	86	85.1	93.5	93.5
	1.00	6	5.9	6.5	100.0
	Total	92	91.1	100.0	
Missing	System	9	8.9		
Total		101	100.0		

Table B57

Correct Judgment with Use of Eye Movement Eric Question Two

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	84	83.2	92.3	92.3
	1.00	7	6.9	7.7	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B58

Correct Judgment with Use of Eye Movement Eric Question Three

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	69	68.3	75.8	75.8
	1.00	22	21.8	24.2	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B59

Correct Judgment with Use of Eye Movement Eric Question Four

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	82	81.2	89.1	89.1
	1.00	10	9.9	10.9	100.0
	Total	92	91.1	100.0	
Missing	System	9	8.9		
Total		101	100.0		

Table B60

Correct Judgment with Use of Eye Movement Eric Question Five

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	81	80.2	88.0	88.0
	1.00	11	10.9	12.0	100.0
	Total	92	91.1	100.0	
Missing	System	9	8.9		
Total		101	100.0		

Table B61

Total Correct Responses for April's Interview

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	7	6.9	8.1	8.1
	1.00	10	9.9	11.6	19.8
	2.00	7	6.9	8.1	27.9
	3.00	14	13.9	16.3	44.2
	4.00	13	12.9	15.1	59.3
	5.00	35	34.7	40.7	100.0
	Total	86	85.1	100.0	
Missing	System	15	14.9		
Total		101	100.0		

Table B62

Total Correct Responses for Jen's Interview

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	29	28.7	34.9	34.9
	3.00	24	23.8	28.9	63.9
	4.00	25	24.8	30.1	94.0
	5.00	5	5.0	6.0	100.0
	Total	83	82.2	100.0	
Missing	System	18	17.8		
Total		101	100.0		

Table B63

Total Correct Responses for Vicki's Interview

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	46	45.5	52.3	52.3
	1.00	9	8.9	10.2	62.5
	2.00	8	7.9	9.1	71.6
	3.00	5	5.0	5.7	77.3
	4.00	11	10.9	12.5	89.8
	5.00	9	8.9	10.2	100.0
	Total	88	87.1	100.0	
Missing	System	13	12.9		
Total		101	100.0		

Table B64

Total Correct Responses for Nathan's Interview

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	18	17.8	20.2	20.2
	1.00	23	22.8	25.8	46.1
	2.00	4	4.0	4.5	50.6
	3.00	10	9.9	11.2	61.8
	4.00	13	12.9	14.6	76.4
	5.00	21	20.8	23.6	100.0
	Total	89	88.1	100.0	
Missing	System	12	11.9		
Total		101	100.0		

Table B65

Total Correct Responses for Matt's Interview

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	2	2.0	2.2	2.2
	2.00	43	42.6	47.8	50.0
	3.00	29	28.7	32.2	82.2
	4.00	10	9.9	11.1	93.3
	5.00	6	5.9	6.7	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B66

Total Correct Responses for Eric's Interview

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	36	35.6	40.4	40.4
	1.00	13	12.9	14.6	55.1
	2.00	10	9.9	11.2	66.3
	3.00	8	7.9	9.0	75.3
	4.00	13	12.9	14.6	89.9
	5.00	9	8.9	10.1	100.0
	Total	89	88.1	100.0	
Missing	System	12	11.9		
Total		101	100.0		

Table B67

Total Correct Judgments with Use of Eye Movement for Vicki

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	59	58.4	65.6	65.6
	1.00	9	8.9	10.0	75.6
	2.00	12	11.9	13.3	88.9
	3.00	10	9.9	11.1	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B68

Total Correct Judgments with Use of Eye Movement for Jen

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	52	51.5	57.8	57.8
	1.00	20	19.8	22.2	80.0
	2.00	18	17.8	20.0	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B69

Total Correct Judgments with Use of Eye Movement for Eric

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	60	59.4	67.4	67.4
	1.00	15	14.9	16.9	84.3
	2.00	8	7.9	9.0	93.3
	3.00	3	3.0	3.4	96.6
	4.00	2	2.0	2.2	98.9
	5.00	1	1.0	1.1	100.0
	Total	89	88.1	100.0	
Missing	System	12	11.9		
Total		101	100.0		

Table B70

Total Correct Judgments with Use of Eye Movement for Matt

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	58	57.4	64.4	64.4
	1.00	12	11.9	13.3	77.8
	2.00	11	10.9	12.2	90.0
	3.00	9	8.9	10.0	100.0
	Total	90	89.1	100.0	
Missing	System	11	10.9		
Total		101	100.0		

Table B71

Total Correct Judgments with Use of Eye Movement on Female Subjects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	42	41.6	46.2	46.2
	1.00	18	17.8	19.8	65.9
	2.00	15	14.9	16.5	82.4
	3.00	10	9.9	11.0	93.4
	4.00	2	2.0	2.2	95.6
	5.00	3	3.0	3.3	98.9
	6.00	1	1.0	1.1	100.0
	Total	91	90.1	100.0	
Missing	System	10	9.9		
Total		101	100.0		

Table B72

Total Correct Judgments with Use of Eye Movement on Male Subjects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	41	40.6	46.6	46.6
	1.00	23	22.8	26.1	72.7
	2.00	12	11.9	13.6	86.4
	3.00	3	3.0	3.4	89.8
	4.00	4	4.0	4.5	94.3
	5.00	3	3.0	3.4	97.7
	6.00	2	2.0	2.3	100.0
	Total	88	87.1	100.0	
Missing	System	13	12.9		
Total		101	100.0		

Table B73

Total Correct Judgments with Use of Eye Movement on All Subjects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	17	16.8	20.2	20.2
	1.00	18	17.8	21.4	41.7
	2.00	12	11.9	14.3	56.0
	3.00	17	16.8	20.2	76.2
	4.00	5	5.0	6.0	82.1
	5.00	8	7.9	9.5	91.7
	6.00	3	3.0	3.6	95.2
	7.00	1	1.0	1.2	96.4
	9.00	2	2.0	2.4	98.8
	10.00	1	1.0	1.2	100.0
	Total	84	83.2	100.0	
Missing	System	17	16.8		
Total		101	100.0		

Table B74

Total Correct Judgments on All Subjects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6.00	1	1.0	1.3	1.3
	9.00	3	3.0	4.0	5.3
	10.00	1	1.0	1.3	6.7
	11.00	8	7.9	10.7	17.3
	12.00	7	6.9	9.3	26.7
	13.00	7	6.9	9.3	36.0
	14.00	7	6.9	9.3	45.3
	15.00	7	6.9	9.3	54.7
	16.00	8	7.9	10.7	65.3
	17.00	4	4.0	5.3	70.7
	18.00	9	8.9	12.0	82.7
	19.00	3	3.0	4.0	86.7
	20.00	4	4.0	5.3	92.0
	21.00	2	2.0	2.7	94.7
	22.00	3	3.0	4.0	98.7
	28.00	1	1.0	1.3	100.0
	Total	75	74.3	100.0	
Missing	System	26	25.7		
Total		101	100.0		

Table B75

Total Correct Judgments on Female Subjects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	1	1.0	1.3	1.3
	3.00	4	4.0	5.1	6.4
	4.00	4	4.0	5.1	11.5
	5.00	4	4.0	5.1	16.7
	6.00	7	6.9	9.0	25.6
	7.00	18	17.8	23.1	48.7
	8.00	5	5.0	6.4	55.1
	9.00	15	14.9	19.2	74.4
	10.00	6	5.9	7.7	82.1
	11.00	2	2.0	2.6	84.6
	12.00	3	3.0	3.8	88.5
	13.00	6	5.9	7.7	96.2
	14.00	1	1.0	1.3	97.4
	15.00	2	2.0	2.6	100.0
	Total	78	77.2	100.0	
Missing	System	23	22.8		
Total		101	100.0		

Table B76

Total Correct Judgments on Male Subjects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	3	3.0	3.5	3.5
	3.00	15	14.9	17.6	21.2
	4.00	6	5.9	7.1	28.2
	5.00	3	3.0	3.5	31.8
	6.00	7	6.9	8.2	40.0
	7.00	16	15.8	18.8	58.8
	8.00	11	10.9	12.9	71.8
	9.00	7	6.9	8.2	80.0
	10.00	6	5.9	7.1	87.1
	11.00	1	1.0	1.2	88.2
	12.00	6	5.9	7.1	95.3
	13.00	3	3.0	3.5	98.8
	15.00	1	1.0	1.2	100.0
	Total	85	84.2	100.0	
Missing	System	16	15.8		
Total		101	100.0		

Appendix C: Survey

Instructions

Sponsored by: Criminal Justice Department Marshall University Huntington, WV 25755-2662

Conducted by: Randal B. Jarvis Graduate Student Criminal Justice Dept. Marshall University

This is a study designed to determine respondents' ability to detect deception during interviews concerning a crime. The information you share in this survey will be kept completely confidential. The researcher wants to learn about your ability to detect the nonverbal cues for deception. Your answers will be anonymous, so please do not place any information on the survey other than that requested.

The survey instrument consists of two sections. The first is a section of demographics to find out information about the respondents in general. The second section is the interview section. It involves six interviews. For each interview the answers to the first five questions are all truthful. This is to allow you to establish a pattern, or baseline, of truthful behavior. For the remainder of the questions the answers can be either true or deception. For these questions, you will be asked to judge if the person is telling the truth or being deceptive. If you think the person is being deceptive, then you are asked to indicate which of the nonverbal cues you observed.

While participating in the survey, you do not have to answer any questions you do not wish to answer. You may skip questions if you wish and stop at anytime.

With the above in mind, are you willing to participate? No Yes.

If you answered the above yes, please answer the questions below. If you answered no, please turn in the survey with those who are participating.

How old are you?		
What is your Class Rank?		Fr. So. Jr. Sr. Grad.
What is your Major?		
What is your Minor?		
What is your gender?		Female D Male
What is your race?		

Have you ever been a police officer?	Yes No
Have you had any training in detecting deception?	Yes No
Whom are you more likely to believe?	Female Male Neither

Section II: Interviews

Please mark the following responses according to whether you believe that they are telling the truth or being deceptive. If you think they are telling the truth, mark that they are telling the truth. If you think they are being deceptive, mark that they are deceptive and mark the nonverbal cues, which you observed, if any.

	Response	
	Truth	Deception
1. What is your name? (Subjects name here)		
2. What is the primary color of this book? (Green)		
3. What is today's date? (2/21/2000)		
4. What is my name? (Randy Jarvis)		
5. What month is this? (February)		
6. Do you know anything about the theft of the pen?		
If you thought the person was deceptive, please check the box in front of the nonverbal cues you observed **Too little eye contact Too much eye contact Blushing Shift in Seating Position Swallowing Excessively** **Eye Movement None of the Cues Were Present**		
7. Did you take the missing pen?		
If you thought the person was deceptive, please check the box in front of the nonverbal cues you observed **Too little eye contact Too much eye contact Blushing Shift in Seating Position Swallowing Excessively** **Eye Movement None of the Cues Were Present**		
8. Is the missing pen in this room?		
If you thought the person was deceptive, please check the box in front of the nonverbal cues you observed **Too little eye contact Too much eye contact Blushing Shift in Seating Position Swallowing Excessively** **Eye Movement None of the Cues Were Present**		
9. What color is the missing pen?		
If you thought the person was deceptive, please check the box in front of the nonverbal cues you observed **Too little eye contact Too much eye contact Blushing Shift in Seating Position Swallowing Excessively** **Eye Movement None of the Cues Were Present**		
10. Do you have the missing pen upon your person right now?		
If you thought the person was deceptive, please check the box in front of the nonverbal cues you observed **Too little eye contact Too much eye contact Blushing Shift in Seating Position Swallowing Excessively** **Eye Movement None of the Cues Were Present**		

Do you know any of the people who participated in the Interviews? D No D Yes If so, check the box indicating the person you know.					
D April	D Vicki	Djen	D Eric	D Nathan	DMatt

In the space below, please feel free to make any comments about deception or this survey. Thank you very much for your participation in this study. Please come to the front of the room and place your survey in the envelop provided. If you have any questions regarding this survey, please feel free to contact Randy Jarvis at (304)-485-8774 or Dr. Margaret Phipps Brown at (304)-696-3086.

Appendix D: Mock Crime Instructions

Instructions given to the truthful subject:

Please exit the room you are in and proceed down the hall to the water fountain. Once at the water fountain, take a drink of water. When finished, proceed back to this room, and sit in the chair provided for you. Once in the room, you will be asked a series of questions regarding the theft of a pen. You are to deny any involvement in the theft of a pen.

Instructions given to the partially truthful/partially deceptive subject:

Please exit the room you are in and proceed to the room next door. Once in the room, you are instructed to tell the person sitting in the chair to remove the pen on the table, and conceal the pen somewhere upon there body. Once they do this, you are to exit the room and wait outside the room, until you are asked to re-enter the room. Once you are instructed to re-enter the room, you will be asked to answer a series of questions regarding the theft of a pen. You are asked to deny any involvement in the theft of a pen.

Instructions given to the completely deceptive subject:

Please exit the room you are in and proceed to the room next door. Once in the room, you are instructed to sit in the chair at the table. You are instructed to wait until another person comes in the room, and gives you a set of instructions. You are to follow through with the instructions. Once the instructions have been followed, you are to exit the room, and wait outside the room, until you are asked to enter the room a second time. Once you are instructed to re-enter the room, you will be asked a series of questions regarding the theft of a pen. You are asked to deny any involvement in the theft of a pen.

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